MAY 11 1911

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JOURNAL OF ELECTRICITY

POWER AND GAS

Devoted to the Conversion, Transmission and Distribution of Energy

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VOL. XXVI NO. 18 | SAN FRANCISCO, MAY 6, 1911 | PER COPY, 25 CENTS

Tomlinson M. C. B. Coupler

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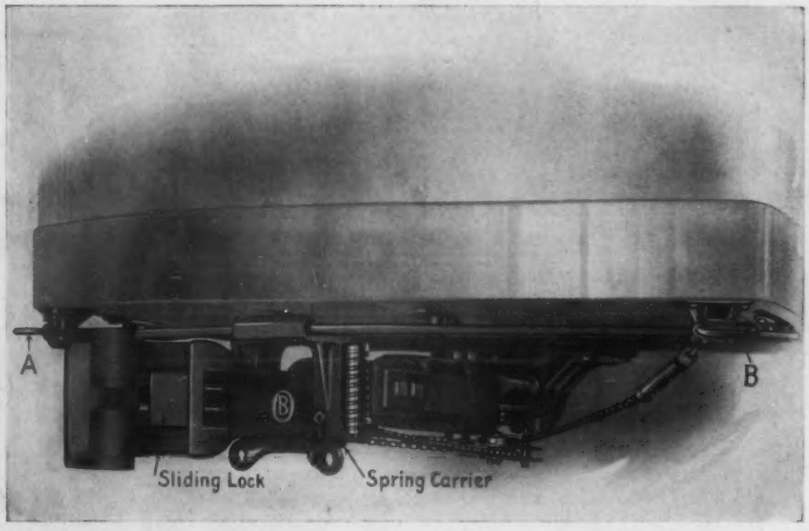

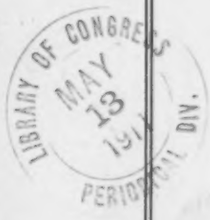

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Furnished complete as shown in cut. Write for full description and price.

The Ohio Brass Co., Mansfield, Ohio

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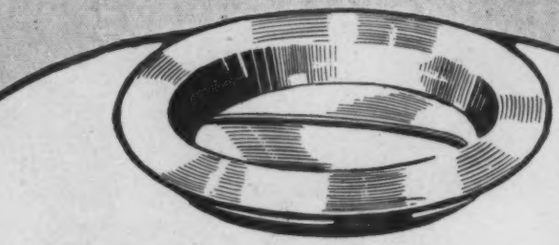
FOR INDEX TO ADVERTISEMENTS SEE PAGE EIGHT



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In building warships the government offers substantial premiums for speed in excess of specified requirements

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Have you ever discovered a dissatisfied buyer? Or, have you ever heard of a dealer who stocked 9-0-3's and was unable to move them?

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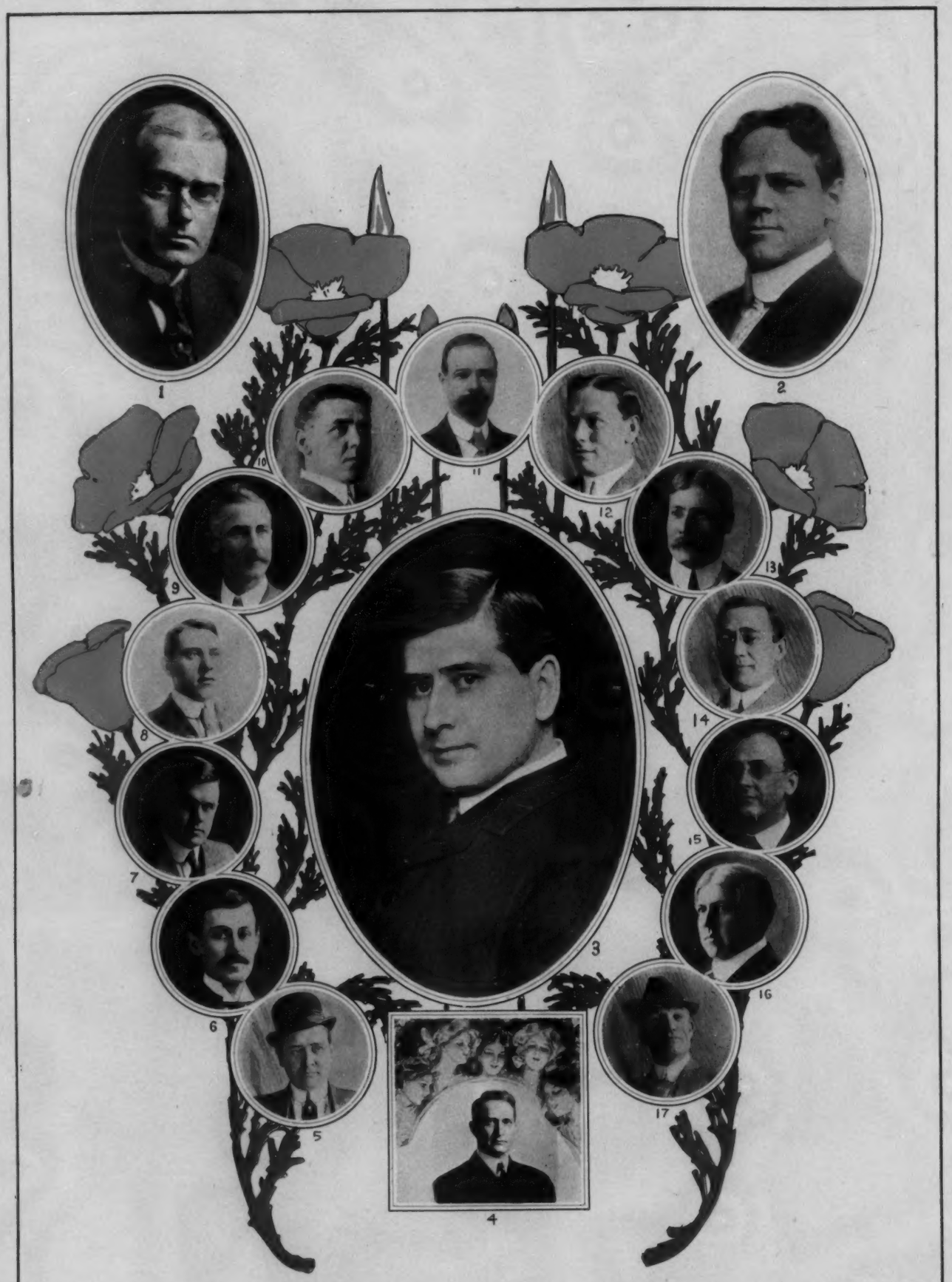
BENJAMIN
9-0-3
Attachment Plug
Date .....
Benjamin Electric Mfg. Co., 151 New Montgomery St., San Francisco.
We estimate our Attachment Plug requirements for the year at .....
Send us complete information on your 9-0-3
Name .....
Address .....

1. Andrew Carrigan
2. Albert H. Elliot
3. C. C. Hillis
4. W. S. Berry
5. H. E. Sanderson
6. H. B. Squires
7. T. E. Burger
8. F. H. Poss
9. H. V. Carter
10. S. B. Gregory
11. C. E. Wiggin
12. W L. Goodwin
13. John R. Cole
14. F. B. Gleason
15. T. E. Bibbins
16. H. G. Aylsworth
17. R. D. Holabird

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JOURNAL OF ELECTRICITY

POWER AND GAS

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VOLUME XXVI | SAN FRANCISCO, MAY 6, 1911 | NUMBER 18

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Hotel Del Monte.

NATIONAL ELECTRICAL JOBBERS' CONVENTION

Never in the history of the old Santa Fe did a twelve-coach train leave the depot of the little village of Chicago carrying brighter light than the "Electrical Jobbers' Special" that left April 18th on its way to the big country west of the Rockies. One hundred and sixty-five men and women, men whose sterling worth was outshone only by the lustre of the beautiful women, whose wit and gaiety was in comparison as the flaming arc is to the miniature carbon. If we were to say Mesdames Low, Merrill, Hill, Sibley, Page, Cudmore, it would simply mean "Mrs. Everyone Else" that were leaders among the ladies.

That preparation had been made before leaving for a good time would hardly be questioned when the next morning at Kansas City, the party received their first "Daily Shock." Cudmore, the inimitable, was its editor, in fact what Cudmore was not on that trip would be easier to describe than what he was. From the rear platform of the observation car to the smoke from the engine, the party ruled supreme. Why mention individual names, Turner, Hemingray, Patton, Skeel, Billy Low, Downs, it's the same old story; each one of the entire party did his or her part and did it well. There was but one complaint that was heard from Chicago to Monterey; one prominent lady said: "The only objection that I can find with this trip is that we haven't had a scrap since we left Chicago."

A chronological history of the occasion requires a shifting of the scene to New York City, where several of the visitors assembled early in April to celebrate the quarter-centenary of Mr. B. M. Downs with the Brookfield Glass Company, those present being: Judge

PACIFIC COAST COMMITTEES

Ladies Reception.
W. S. Berry, Chairman
John R. Cole
E. N. Fobes
F. H. Poss
P. H. Aaron
Pacific Coast Ladies.

Trophies.
C. C. Hillis, Chairman
Albert H. Elliot

Tennis Tournament
F. B. Gleason, Chairman

Executive.
C. C. Hillis, Chairman
R. D. Holabird
W. L. Goodwin
Andrew Carrigan
F. B. Gleason

Program and Printing.
W. L. Goodwin, Chairman
R. D. Holabird

Pool Tournament.
T. E. Burger, Chairman

Golf Tournaments.
R. D. Holabird, Chairman
W. L. Goodwin
T. E. Bibbins
H. F. Sanderson

To Meet Train
H. V. Carter, Chairman
T. E. Burger
N. M. Graham

Trap Shooting.
C. E. Wiggin

Manufacturers
H. G. Aylesworth, Chairman
H. E. Sanderson
S. B. Gregory
H. B. Squires
F. H. Poss

Spanish Dinner
R. D. Holabird, Chairman
W. L. Goodwin
F. B. Gleason
Frank Fowden
C. C. Hillis

T. M. Debevoise, toastmaster; Frank Brookfield, secretary and treasurer Brookfield Glass Co.; R. G. Hemingray, president Hemingray Glass Co.; R. E. Gallaher, secretary New York Insulated Wire Co.; W. L. Fort, Western Electric Co.; George Elliott, Electrical World; R. B. Corey, president R. B. Corey Co.; E. W. Rockefellow, supply sales manager Western Electric Co.; J. B. Olsen, secretary Habirshaw Wire Co.; F. F. Downs, treasurer and manager U. S. Can. Co., Cincinnati; W. Joerger, General Chemical Co.; W. S. Benedict, Benedict & Benedict, Brooklyn; Herbert Sinclair, Star Porcelain Co., Trenton; T. L. Cuyler, assistant treasurer Postal Telegraph Cable Co.; Clarence Winter, lawyer; C. C. Hay, Ingersoll Rand Co.; A. H. Pease, president Hart & Hegeman Co.; A. T. Clark, secretary American Circular Loom Co.; Walter Cary, manager Westinghouse Lamp Co.; C. W. Price, Electrical Review; B. M. Downs, vice-president Brookfield Glass Co.

This pleasant occasion on the eve of the departure of many of the guests for the Coast was but a prelude to the entertainment provided en route to the Coast, As chairman of the entertainment Committee, Mr. H. H. Cudmore was ably assisted by L. W. Kittman, C. C. Sibley, T. C. Ringgold and Robert Kuhn.

More "Daily Shocks" were administered at Kansas City and the Grand Canyon, with Charlie Corrigan as sporting editor, J. J. Provost doing the society stunt, and Mat Austin as funny man. Aside from the many jokes and joshes perpetrated, it contained the program for each day and other matters of immediate interest. This sheet, like Joseph's coat, was one of many colors, alternating yellow, pink and green. Though thus short-lived, it may be revived at future meetings as the occasion arises.

An elaborate song-book was also distributed containing the words of many of the popular songs, whose singing enlivened many an hour of the journey. Throughout the trip card tournaments of all kinds were conducted with prizes for the winners, whether bridge, 500 or the great American game. For the devotees of the latter pastime the American Electrical Heater Co. of Detroit considerately supplied a score

A Group Enroute.

or more sets of chips, whose lucky winners will long preserve them as mementoes.

The observation car was converted into a keno palace, with cards for all comers, the house winnings buying flowers for the ladies. Informal vaudeville and music filled the interim.

Long before the desert appeared the Pullman porters considerately provided great paper bags for the ladies' hats, but neglected to provide like equipment for the masculine element, who were forced to dig off the dunes of sand which buried their blue serge suits. An insatiable thirst also seized the party as the desert was reached and was alleviated only by the wines of California. The novelty of the desert, its spaciousness and freedom, its shades and shadows, and

The Squaw and White Man.

its strange vegetation finally palled upon the travelers and they were again glad to return to the many amusements provided in the car.

Several stops were made en route, but the first of importance was the Grand Canyon of the Colorado, where the train arrived before breakfast on the morning of April 21st. The entire day was spent at the

At the Grand Canyon.

Canyon, a number of the gentlemen and two ladies, Mrs. Scott and Mrs. Hill, descending to the river, some five thousand feet below. The rest of the party enjoyed the hospitality of the place and it was reported

that the "Squaw and White Man's Dance" was only second to the graceful and beautiful dancing of Miss Cotabish, who favored the party many times during the trip and to whom, if to any one, special credit should be given, for an ever-ready response to the request to entertain.

Leaving the Grand Canyon that evening it was midnight when they crossed into California. At ten o'clock on the morning of the 22d, Embassador H. V. Carter, Mr. Willis Booth of Los Angeles and a representative of the Journal met the party at Barstow. Which one of the welcoming party was the cause has not been settled at this writing, but certain it was that Old Sol covered his face with clouds, as much as to say, "I do not dare to witness what is to follow."

Willis Booth.

Grill Room, Hotel Alexandria.

The visitors of course were disappointed at not seeing sunshine in the land that has been made famous by it, but they were welcomed so warmly at Uplands by the ladies' reception committee, who escorted them through two of the largest orange packing houses in the State, all of which was intensely interesting to the visitors, that they soon forgot the shadow. Upon leaving the building they were presented with a small Japanese basket filled with fruit and a spray of orange blossoms with its sweet aroma.

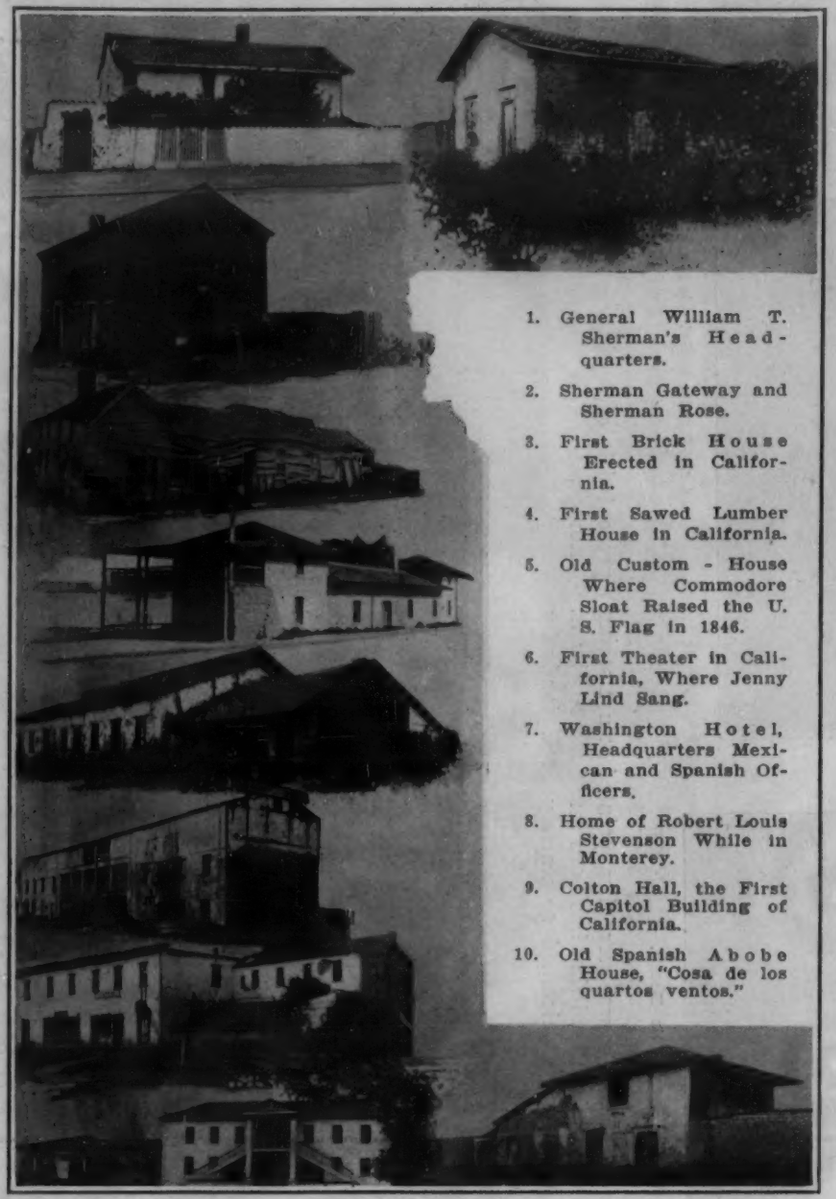
Automobiles were in readiness, furnished by that generous Southern Californian, Willis Booth, the party were taken over the seven-mile Euclid Avenue drive to the foot of old Baldy, where the contrast of the snows on the summit to the oranges and flowers of the valley was a subject of great wonder.

As the machines passed the High School at Ontario a bevy of school girls showered the occupants with roses. A stop was made at the Pacific Electric Heating Company's plant, where liquid refreshments were awaiting them at the entrance. A dozen or more young lady employees of the company, in all their white loveliness, served the most delicious fruit punch. California's native flower, the poppy, and the wild lupin were the decorations. After inspecting the many interesting departments of this, the largest electrical factory on the Coast, and many seeing for the first time the component parts of a heating iron, they were escorted into the show rooms, where the cases had been transformed into lunch counters, with cakes, fruits and dainties in abundance, electrical toasters were being worked to their full capacity; many electric percolators were temptingly displaying their fountains of amber to the admiring visitors. Coffee was served and a hearty "three cheers" given for the officers of the company and their employees. Unique booklets descriptive of the trip from Uplands to Los Angeles were presented to each of the party as they re-entered their automobile. This souvenir was treasured by all.

A delay of one hour in reaching Uplands caused the cancelling of the intended trip to old Mission San Gabriel and Pasadena, where special arrangements had been made for the opening of the Busch Gardens. The party arrived at Hotel Alexandria, Los Angeles, at 6:30 p. m. tired, a little dusty but very happy. As the guests entered their rooms they were greeted with another pleasant surprise, the Chamber of Commerce of Los Angeles, as it always does, anticipated their coming, and with their compliments had a basket of oranges and a bottle of wine there to greet them.

Sunday was devoted to trolley trips and other amusements not programmed. The directors of the Jonathan Club sent cards to each of the gentlemen and on Saturday evening a creditable Bohemian jinks was pulled off for the enjoyment of the visitors.

Monday morning at 8:05 the party returned to their old quarters on the "Electrical Jobbers' Special" and strange as it may appear, the sun remained in hiding. A short stop was made at Santa Barbara. The



1. General William T. Sherman's Headquarters.
2. Sherman Gateway and Sherman Rose.
3. First Brick House Erected in California.
4. First Sawed Lumber House in California.
5. Old Custom - House Where Commodore Sloat Raised the U. S. Flag in 1846.
6. First Theater in California, Where Jenny Lind Sang.
7. Washington Hotel, Headquarters Mexican and Spanish Officers.
8. Home of Robert Louis Stevenson While in Monterey.
9. Colton Hall, the First Capitol Building of California.
10. Old Spanish Abobe House, "Cosa de los quartos ventos."

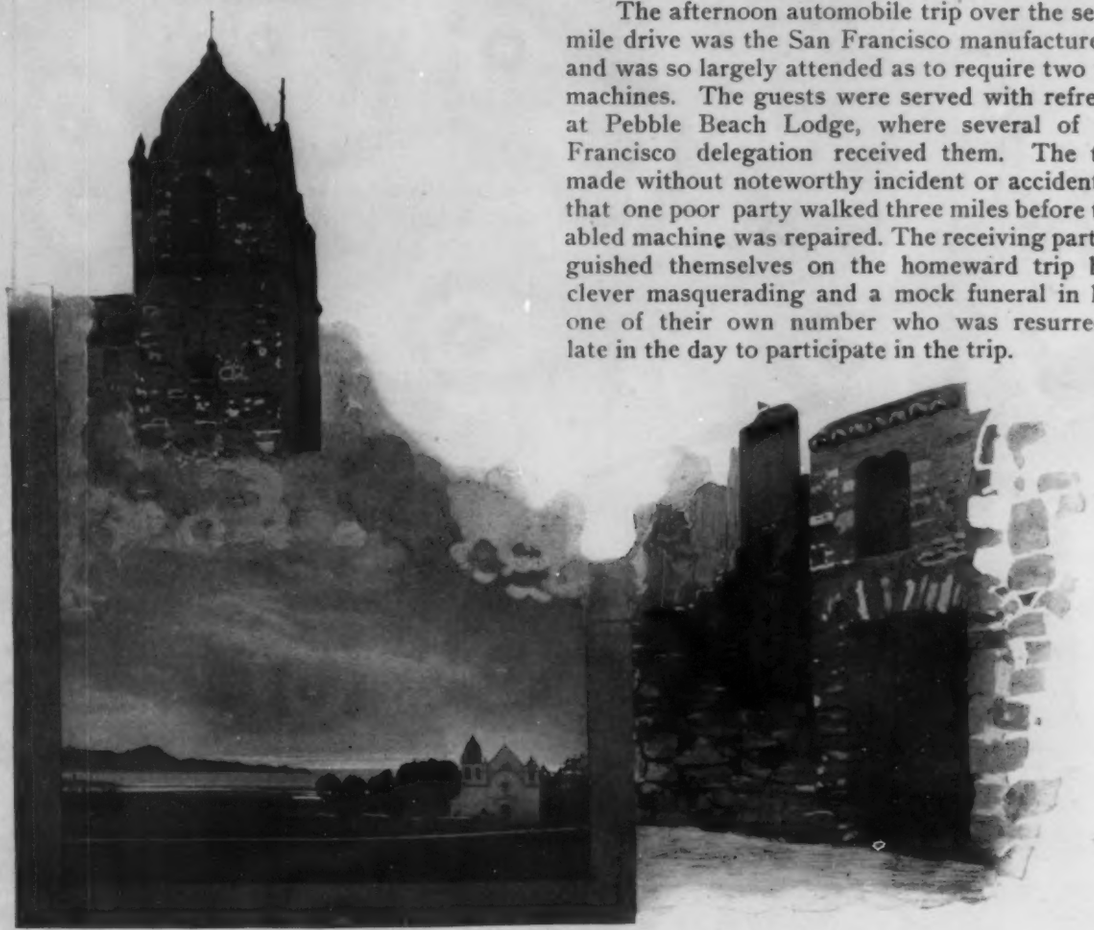
Historic Landmarks of Monterey.

On the Seventeen-Mile Drive.

Pebble Beach Lodge.

beauty of the Coast Line scenery will be remembered by all and at 10:30 the evening of April 24th, five days from Chicago, they arrived at their destination, Del Monte.

We have spoken of the entertaining committee and the pleasures and a few of the pleasant events of the trip, but to one man alone is due the credit of the perfect arrangements, the excellent service, and in a large measure the good nature of this party, and that is to the genial secretary of the National Association of Electrical Jobbers, Franklin Overbagh.



Carmel Mission.

This is the beginning of another story; "they're here!" Toot, toot, toot, bang, bang, bang, red fire, and in so short a time that the party hardly realized that they were out of their car than they found themselves whizzing in automobiles through one of the most beautiful parks in the world, lighted for the occasion, and greeted at the doors of Del Monte by the warm-hearted Western men and women. Who but H. R. Warner and his able staff of assistants could have in the short space of thirty minutes cleared that office of several truck loads of baggage and housed two hundred guests comfortably in their rooms as if they had been there a week.

The ladies soon retired, but the men—oh, where were they? Ask Billy, the bar-keep; Jimmie, the pool room man; Dick, the porter; the maze, the great oaks, the palms, or even old Monterey. They won't tell; neither will we, for we don't know. But one thing sure, an Eastern tenderfoot, male or female, out for a good time, will put a wild and woolly Westerner so far back in the woods, that it would take a globe trotter to find them. Is it any wonder the sun wouldn't shine?

By 10 a. m. Tuesday everybody was in evidence, the jobbers for alleged business, the ladies for pleasure, and the manufacturers for relaxation. The jobbers' first session was short and formal and soon freed them for enjoyment of the surrounding attractions. The ladies were piloted to the historic land marks of Monterey, returning in time for lunch..

The afternoon automobile trip over the seventeen-mile drive was the San Francisco manufacturers' treat and was so largely attended as to require two relays of machines. The guests were served with refreshments at Pebble Beach Lodge, where several of the San Francisco delegation received them. The trip was made without noteworthy incident or accident, except that one poor party walked three miles before their disabled machine was repaired. The receiving party distinguished themselves on the homeward trip by some clever masquerading and a mock funeral in honor of one of their own number who was resurrected too late in the day to participate in the trip.

Tuesday evening a concert was given in the ball room by some of the more talented guests, who received the well merited applause of all present. A start was also made on the pool tournament. After concert suppers were enjoyed until an early hour on Wednesday morning, though the most irrepressible were not subdued until 3 a. m.

Wednesday morning, while the jobbers were in convention assembled, the ladies viewed the submarine gardens and the manufacturers played the qualifying round at golf. Unfortunately the phonographic records of the fruitless search for lost balls cannot be here reproduced, which is perhaps just as well.

Wednesday afternoon the jobbers played golf, the nineteenth hole soon becoming the center of attraction. The marksmen shot clay pigeons and the tennis enthusiasts started their games.

Wednesday evening before retiring for the night the sun peeped out and the picture that presented

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DESIGNED
& MADE
BY
SHREVE & Co
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Events, Trophies and Winners.

EVENT.		TROPHY.	WINNER.
Trap Shooting	1.	Tankard	A. E. Drendell.
Approaching and Putting Contest	2.	Cup. Donated by Shreve & Co.	E. M. Demming.
Runner-Up Jobbers' First Flight	3.	Cup	C. C. Sibley.
Manufacturers' Qualifying Round	4.	Goblet. Donated by Hotel Del Monte.	R. J. Davis.
Best Score Jobbers' Qualifying Round	5.	Goblet. Donated by Hotel Del Monte.	R. D. Holabird.
First Men's Tennis Tournament	6.	Military Brushes	H. I. Sackett.
Runner-Up Manufacturers' First Flight	7.	Cup	T. E. Bibbins.
Winner Manufacturers' First Flight	8.	Goblet	W. J. Grady.
Winner Jobbers' Third Flight	9.	Cup	Chas. White. (H.V. Carter, tied)
Winner Jobbers' Second Flight	10.	Goblet. Donated by T. E. Bibbins.	C. P. Hill.
Women's Putting Contest	11.	Cologne Bottle. Donated by T. E. Bibbins.	Mrs. E. W. Rockafellow.
Men's Approaching and Putting Contest	12.	Flask. Donated by T. E. Bibbins.	E. M. Demming.
First Women's Tennis Tournament	13.	Candy Jar	Miss K. Carter.
Winner Manufacturers' Third Flight	14.	Goblet	E. K. Patton
Second Men's Tennis Tournament	15.	Silver Deposit Bottle	G. R. Jones.
Winner Jobbers' First Flight	16.	Cup. Donated by T. E. Bibbins	Fred Fullerton.
Second Women's Tennis Tournament	17.	Bridge Whist Set	Mrs. H. G. Aylsworth.
First Pool Tournament	18.	Cup	W. T. McCullough.
Second Pool Tournament	19.	Silver Deposit Bottle	W. S. Berry.
Winner Manufacturers' Second Flight	20.	Cup	B. M. Downs.
Men's Driving Contest	21.	Tankard. Donated by Andrew Carrigan	H. E. Sanderson

itself caused him to cry himself to sleep. The ladies thought it was rain. Spike tails were pressed and ball gowns donned for a night of dancing.

Thursday opened bright with the sun staring them in the face, as much as to say, "Do your worst, I'm here for the day." With sunshine added to the radiance of the beautiful women and the glorious scene, it was like a transformation. All talk of the west coast of Florida, the salubrious climate of Spain and Italy ceased, Del Monte had added to her million and more admirers, the electrical jobbers, the manufacturers, and their ladies of the United States. The finals in the several contests of tennis, golf and pool were finished, the ladies putting contest, the whist, 500, keeno, and old maid gambling games were decided.

Trap-Shooting.

As the notice on the bulletin board read "Dress for the Spanish dinner as you please, but come," everyone was soon ready for the bursting of the bomb. This Spanish dinner was held in the opera house of old Monterey. Again the wonderful ability of Boniface Warner as an entertainer and host was exemplified.

Ladies' Putting Contest.

Places had been set for 250 (you will note each event. the number has been increased, at this time nearly all the guests of Del Monte had joined the jobbers' party). Arrangements were so perfect that it took but a short time for everyone to find their proper place.

The toastmaster requested the guests to be seated, this was followed by a bombardment of serpentine from the "gringos," some dozen or fifteen of the bright lights of the East and West, who donned the Spanish costume. In one short minute where all had been clear overhead, was now a perfect maze of spider webs in all colors of the rainbow. Thousands of strands of this colored paper festooned and draped in the most fantastic shapes, only as accident could design, no art could have formed a more beautiful picture. This was allowed to remain but a few moments as things and things and things were to happen. Each guest literally tore himself loose and soon the floor was carpeted with paper.

The menu was a simple Mexican dish known as a a "hot tamale," a dish of enchiladas and Mexican "Hades" stew; following this was an ice cream to cool off. During the dinner the following musical program was given:

Selection .....Spanish Orchestra
Feliciano Graxiola, Director.

El Chirrion (The Whip Dance).....Senorita Dulce Osio

La Cacucha (Dance).....Senorita Jobinita Graxiola

La Paloma (Song).....Senorita Frances Diaz

La Esmeralda de Portola (Dance) .....Chiquita Beatrice Osio

A Gypsy Maiden (Solo) .....*Parker*
Miss Pickering.

El Jarabe (Mexican Jig).....
.....Senor Roman Valencia y Senora Juanita Clay

La Contradanza (Mexican Figure Dance).....

Senoras: Marta Cooper, Margarita Estrada, Ray Baubian, Julia Trenner, Dulcie Osio, Maria Baddres.

Senores: F. Graxiola, Vicente Estrada, Esteben Davis, L. Trenner, Jose Madriaga, Y. A. Dutra.

La Barsobiana .....By the Company

After the dinner the tables were cleared from the room and the debonnaire Andrew Carrigan, from the stage, announced the winners and distributed the prizes in a novel and enjoyable way, calling upon some member of the audience to deliver the presentation speech. Not one word of the speeches will we attempt to chronicle, or we would have to give them all. Before half of the prizes had been distributed it became a case of grab-bag, as those who did not win prizes were impatient for the dances. A quarter of a serpentine football match was played, then dancing and jollity ad libitum.

Among those who did not stay away were P. J. Aaron, Western Electric Co., Seattle, Wash.; R. Ackerman, Western Electric Co., Salt Lake City, Utah; Mr. and Mrs. W. L. Adams, Union Hardware & Electric Supply Co., Providence, R. I.; Harry Adams, R. B. Corey & Co., New York, N. Y.; D. E. Albert, Los Angeles, Cal.; Mr. and Mrs. F. T. Andrea, Julian Andrea & Sons Co., Milwaukee, Wis.; F. N. Averill, Fobes Supply Co., Portland, Ore.; W. B. Ayer, Belcher-Loomis Hardware Co., Providence, R. I.; Mr. and Mrs. H. G. Aylsworth, Aylsworth Agencies Co., San Francisco, Cal.;

F. C. Barrington, Columbian Electric Co., St. Joseph, Mo.; F. M. Bernardin, The B-R Electric & Tel. Mfg. Co., Kansas City, Mo.; Mr. and Mrs. W. S. Berry, Western Electric Co., San Francisco, Cal.; H. D. Betts, Thomas & Betts, New York, N. Y.; T. E. Bibbins, General Electric Co., San Francisco, Cal.; Julian Binford, Jr., Tower-Binford Electric & Mfg. Co., Richmond, Va.; H. W. Bliven, Harvey Hubbell Co., Bridgeport, Conn.; Mr. and Mrs. F. N. Boyer, General Electric Co., Chicago, Ill.; Mr. and Mrs. W. W. Briggs, Westinghouse Electric & Mfg. Co., San Francisco, Cal.; Mr. and Mrs. John W. Brooks, Pass & Seymour Co., Syracuse, N. Y.; Mr. and Mrs. Chas. E. Browne, American Electrical Supply Co., Chicago, Ill.; W. A. Browne, M. B. Austin & Co., Chicago, Ill.; T. E. Burger, Western Electric Co., Los Angeles, Cal.;

Mr. and Mrs. Andrew Carrigan and daughter, Dunham, Carrigan & Hayden Co., San Francisco, Cal.; H. V. Carter and daughter, Pacific States Electric Co., San Francisco, Cal.; C. H. Carter, Pacific States Electric Co., Los Angeles, Cal.; Mr. and Mrs. J. O. Case, General Electric Co., Los Angeles, Cal.; B. C. Chase, Los Angeles, Cal.; James Clark, Jr., James Clark, Jr.

Ladies at Pebble Beach Lodge.

Electric Co., Louisville, Ky.; R. F. Cleavenge, Pittsburg, Pa.; Mr. and Mrs. Geo. A. Cole, John R. Cole Co., Los Angeles; Mr. and Mrs. John R. Cole, John R. Cole Co., San Francisco, Cal.; Mr. and Mrs. John J. Cooper, Mountain Electric Co., Denver, Colo.; Mr. and Mrs. C. E. Corrigan, National Metal Moulding Co., Pittsburg, Pa.; Mr. and Mrs. N. C. Cotabish and daughter, National Carbon Co., Cleveland, Ohio.; J. Robert Crouse, Cleveland, Ohio; Mr. and Mrs. H. H. Cudmore, Brilliant Electric Co., Cleveland, Ohio;

Mr. and Mrs. A. D. Dana, Chicago Fuse Mfg. Co., New York, N. Y.; Mr. and Mrs. J. C. Davidson, Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.; C. C. Davis, General Electric Co., San Francisco, Cal.; R. J. Davis, Century Electric Co., San Francisco, Cal.; Judge T. M. Debevoise, New York City.; C. R. Dederick, C. R. Dederick Electric Supply Co., Portland, Ore.; W. M. Deming, General Electric Co., Schenectady, N. Y.; V. R. Despard, Pass & Seymour, Syracuse, N. Y.; Mr. and Mrs. D. D. Dickey, National Carbon Co., Cleveland, Ohio; R. J. Dinwiddie, Salt Lake City, Utah; B. M. Downs, Brookfield Glass Co., New York, N. Y.; Mr. and Mrs. T. W. Dunk, Florida Electric Co., Jacksonville, Fla.; A. E. Drendell, Drendell Electric & Mfg. Co., San Francisco, Cal.; E. J. Dwyer, Holabird Electric Co., Seattle, Wash.;

J. S. Eells, Pacific States Electric Co., San Francisco, Cal.; F. W. Eastman, Stanley & Patterson Co., New York, N. Y.; Mr. and Mrs. Albert H. Elliott and daughter, San Francisco, Cal.

Mr. and Mrs. P. M. Fletcher, Fletcher-Stanley Co., New York, N. Y.; E. N. Fobes, Fobes Supply Co., Seattle, Wash.; Frank Fowden, Brooks-Follis Co., San Francisco, Cal.; H. F. Frosch, Federal Electric Co., San Francisco, Cal.; Mr. and Mrs. F. W. L. Fullerton, Fullerton Electric Co., New York, N. Y.;

A. C. Garrison, Columbia Incandescent Lamp Co., St. Louis, Mo.; L. V. Garron, Frank H. Stewart Electric Co., Philadelphia, Pa.; Mr. and Mrs. V. F. Gates, National Metal Moulding Co., Pittsburg, Pa.; Mr. and Mrs. J. F. Gilchrist and children, Chicago, Ill.; S. W. Gilman, San Francisco, Cal.; F. B. Gleason, Western Electric Co., San Francisco, Cal.; Mr. and Mrs. W. L. Goodwin, Pacific States Electric Co., San Francisco, Cal.; Mr. and Mrs. W. J. Grady, Faries Mfg. Co., Decatur, Ill.; Mr. and Mrs. E. C. Graham, National Electric Supply Co., Washington, D. C.; N. W. Graham, Holabird, Reynolds Co., Los Angeles, Cal.; Mr. T. H. Green, Wheeler-Green Electric Co., Rochester, N. Y.; Mr. and Mrs. S. B. Gregory, Arrow Electric Co., San Francisco, Cal.; Mr. and Mrs. L. Griesser, Cleveland Electric Supply Co., Cleveland, Ohio.

H. S. Hadley, Harvey Hubbell Co., Bridgeport, Conn.; C. W. Hahn, San Francisco, Cal.; C. B. Hall, Pasadena, Cal.; A. H. Halloran, Journal of Electricity, Power & Gas, San Francisco, Cal.; Mr. and Mrs. C. M. Hamilton, F. Bissell Co., Cleveland, Ohio; E. D. Hand, Decker Electric Co., San Francisco, Cal.; Mr. and Mrs. F. S. Hardy, Frank S. Hardy & Co., Boston, Mass.; Ross Hartley, Pacific States Electric Co., Portland, Ore.; Mr. and Mrs. N. G. Harvey and daughter, Illinois Electric Co., Chicago, Ill.; C. B. Hawley, Salt Lake City, Utah; D. C. Hemingray, Hemingray Glass Co., Covington, Ky.; Mr. and Mrs. J. A. Herr, Sprague Electric Co., San Francisco, Cal.; Mr. and Mrs. W. R. Herstein, Electric Supply Co., Memphis, Tenn.; Mr. and Mrs. C. P. Hill, Double-Day Hill Electric Co., Pittsburg, Pa.; Mr. and Mrs. C. C. Hillis, Electric Appliance Co., San Francisco, Cal.; Chas. I. Hills, Franklin Incandescent Lamp Co., New York, N. Y.; J. L. Hinds, Crouse, Hinds Co., Syracuse, N. Y.; R. D. Holabird, Holabird, Reynolds Co., San Francisco, Cal.; H. H. Hornsby, Sprague Electric Co.; New York, N. Y.; Mr. and Mrs. J. H. Hughes, New York, N. Y.; Chas. Hudson, Los Angeles, Cal.;

Spencer Isely, Milwaukee, Wis.;

G. R. Jones, North Shore Electric Co., Chicago, Ill.; Paul Joyslin, Western Electric Co., Dallas, Tex.;

Geo. E. Kellogg, Central Electrical Supply Co., New York, N. Y.; Mr. and Mrs. R. C. Kemp and daughter, Montana Electric Co., Butte, Mont.; G. I. Kinney, Fort Wayne Electric Co., San Francisco, Cal.; L. W. Kittman, Chicago, Ill.; Mr. and Mrs. P. S. Klees, Franklin Electrical Mfg. Co., Hartford, Conn.; B. F. Klein Brass Fixture Co., Cleveland, Ohio; L. W. Korsemeyer, Korsemeyer Co., Lincoln, Neb.; Robert Kuhn, American Electric Heater Co., Detroit, Mich.; Mr. and Mrs. E. J. Kulas, Tungstolier Co., Cleveland, Ohio;

L. A. Landan, New York City, N. Y.; H. M. Lauritzen, Holophane Co., San Francisco, Cal.; C. W. Leveridge, New York, N. Y.; A. W. Lindgren, Minneapolis Electrical Engineering Co., Minneapolis, Minn.; Mr. and Mrs. C. J. Litscher, C. J. Litscher Electric Co., Grand Rapids, Mich.; F. W. Loomis, Holophane Co., San Francisco, Cal.; M. E. Logan, San Francisco, Cal.;

Mr. and Mrs. W. W. Low, Electric Appliance Co., Chicago, Ill.;

Mr. and Mrs. W. T. McCullough, McCullough Elec. Co., Pittsburg, Pa.; J. W. McDowell, Manhattan Electrical Supply Co., New York, N. Y.; Mr. and Mrs. M. McGraw, Interstate Elec. & Mfg. Co., Sioux City, Iowa; H. F. McGregor, Providence, R. I.; D. S. McGonigle, B-R Elec. & Tel. Co., Kansas City, Mo.; Mr. and Mrs. C. T. McKinstry, The Erner Elec. Co., Cleveland, Ohio; J. R. McNaughton, McNaughton-McRay Elec. Co., Detroit, Mich.; A. P. Manning, Cutler-Hammer Mfg. Co., New York, N. Y.; Mr. and Mrs. W. W. Merrill, Chicago Fuse Mfg. Co., Chicago, Ill.; L. H. Mertz, Pacific Electric Heating Co., Ontario, Cal.; A. G. Monroe, Nebraska Electric Co., Omaha, Neb.; Mr. and Mrs. R. C. Murdock, Iron City Elec. Co., Pittsburg, Pa.; F. H. Murray, Los Angeles, Cal.; F. S. Mills, H. W. Johns-Manville Co., Los Angeles;

Mr. and Mrs. R. F. Oakes, American Ever Ready Co., San Francisco, Cal.; L. J. O'Brien, New England Elec. Supply Co., Hartford, Conn.; W. I. Otis, Otis & Squires Co., San Francisco, Cal.; Franklin Overbaugh, General Secretary National Electrical Jobbers' Association, Chicago, Ill.;

Mr. and Mrs. A. D. Page and daughter, General Electric Co., Harrison, N. J.; A. H. Patterson, Phoenix Glass Co., New York, N. Y.; Mr. and Mrs. G. L. Patterson, Stanley & Patterson, New York, N. Y.; F. G. Patterson, New York, N. Y.; A. N. Palmer, Phillips Insulated Wire Co., Pawtucket, R. I.; E. K. Patton, Bryant Electric Co., Chicago, Ill.; R. L. Phelps, Safety Insulated Wire & Cable Co., San Francisco, Cal.; Mr. and Mrs. J. G. Pomeroy, Adams-Bagnall Co., Chicago, Ill.; F. H. Poss, Holophane Co., San Francisco, Cal.; Mr. and Mrs. F. S. Price, Pettingell-Andrews Co., Boston, Mass.; J. P. Provost, Union Electric Co., Pittsburg, Pa.;

Mr. and Mrs. T. C. Ringgold, Central Electric Co., Chicago, Ill.; Mr. and Mrs. E. W. Rockafellow, Western Electric Co., New York, N. Y.; R. L. Robertson, San Jose, Cal.; Mr. and Mrs. P. H. Rutter, Newark, Elec. Supply Co., Newark, N. J.; J. F. Ryan, Portland, Ore.; S. P. Russell, H. W. Johns-Manville Co., San Francisco;

H. I. Sackett, Buffalo, N. Y.; Mr. and Mrs. S. H. Sands, Elec. & Mfg. Co., Wheeling, West Virginia; H. E. Sanderson, Bryant Electric Co., San Francisco, Cal.; R. F. Sanford, San Francisco, Cal.; Mr. and Mrs. E. M. Scribner and children, Arrow Electric Co., Chicago, Ill.; R. H. Scranton, American Elec. Heating Co., Detroit, Mich.; Mr. and Mrs. E. L. Scott, Kansas City Elec. & Tel. Supply Co., Kansas City, Mo.; Mr. and Mrs. L. A. Schwab, Monarch Elec. & Wire Co., Chicago, Ill.; Mr. and Mrs. H. B. Scott, Syracuse Elec. Co., Syracuse, N. Y.; Mr. and Mrs. W. H. Seaver, American Steel & Wire Co., San Francisco, Cal.; A. A. Serva, Fort Wayne Electric Co., Fort Wayne, Ind.; I. A. Shorno, Portland, Ore.; W. H. Seldon, Miller-Seldon Elec. Co., Detroit, Mich.; Mr. and Mrs. C. C. Sibley, Sibley & Pitman, New York, N. Y.; F. F. Skeel, Crouse-Hinds Co., Syracuse, N. Y.; Mr. and Mrs. G. I. Smith and children, J. F. Buchanan, Elec. Supply Co., Philadelphia, Pa.; M. F. Steel, Benjamin Electric Mfg. Co., San Francisco, Cal.; Mr. and Mrs. F. H. Stewart, F. H. Stewart Elec. Co., Philadelphia, Pa.; Mr. and Mrs. F. E. Stow, H. C. Roberts Elec. Supply Co., Philadelphia, Pa.; Mrs. W. E. Strater, Louisville, Ky.; Mr. and Mrs. E. B. Strong, Journal of Electricity, Power & Gas, San Francisco, Cal.; J. D. Sweeney, Royal-Eastern Elec. Supply Co., New York, N. Y.; Mr. and Mrs. J. E. Swisher, Globe Elec, Co., Dayton, Ohio;

Mr. and Mrs. Samuel H. Taylor, Elec. & Mfg. Co., San Francisco, Cal.; F. S. Terry, National Lamp Association, Cleveland, Ohio; Mr. and Mrs. J. B. Terry, J. G. Terry Co., Cedar Rapids, Iowa; W. J. Toncin, Ansonia Elec. Co., Ansonia, Conn.; Mr. and Mrs. O. C. Turner, Southern Wesco Supply Co., Birmingham, Ala.;

J. A. Vandegrift, National Electric Lamp Association, San Francisco, Cal.; H. F. Van Riper, Seattle, Wash.; H. B. Vanzwoll, Sunbeam Incandescent Lamp Co., Chicago, Ill.; W. H. Vanzwoll, Chicago, Ill.;

Mrs. Annie Warner, Philadelphia, Pa.; T. G. Whaling, Westinghouse Lamp Co.; Bloomfield, N. J.; Mr. and Mrs. Chas. F. White, Geo. H. Buckminster, Co., Boston, Mass.; C. E. Wiggin, Dunham, Carrigan & Hayden Co., San Francisco, Cal.; H. S. Wilson, F. H. Stewart Elec. Co., Philadelphia, Pa.; A. E. Williams, Colonial Elec. Co., Warren, Ohio; H. B. Woodill, Woodill-Hulse Co., Los Angeles, Cal.; F. H. Woodward, Ruud Automatic Gas Heater Co., San Francisco, Cal.;

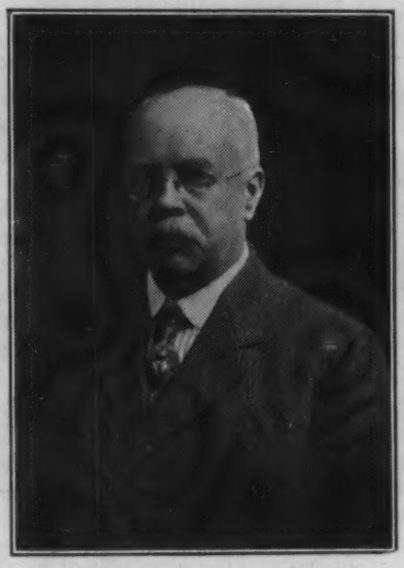
Garnet Young, Tel. & Elec. Equipment Co., San Francisco, Cal.

LAMP ASSOCIATION DISSOLVES.

The Association of Licensed Manufacturers of Incandescent Lamps has dissolved. This association manufactures lamps under patents of the General Electric Company, which as licensor, it is alleged, has heretofore fixed the prices, terms and conditions under which lamps covered by patents owned by it are manufactured and sold. These manufacturers will continue as licensees of the General Electric Company, but the formal association is discontinued. The companies involved in the dissolution are as follows: General Electric Company, Westinghouse Electric & Manufacturing Company, Westinghouse Lamp Company, National Electric Lamp Company, Aetna Electric Company, American Incandescent Lamp Company, Banner Electric Company, Brilliant Electric Company, Bryan-Marsh Company, Buckeye Electric Company, Capital Electric Company, Colonial Electric Company, Columbia Incandescent Lamp Company, Economy Electric Company, Franklin Electric Manufacturing Company, General Incandescent Lamp Company, Independent Incandescent Lamp Company, Kentucky Electric Company, Liberty Electric Manufacturing Company, Munder Electric Company, Standard Electric Manufacturing Company, Sterling Electric Manufacturing Company, Sunbeam Incandescent Lamp Company, Warren Electric Specialty Company, Gilmore Electric Company, Fostoria Incandescent Lamp Company, New York & Ohio Company and Shelby Electric Company.

PACIFIC COAST A. I. E.E. CONVENTION.

The Los Angeles convention of the American Institute of Electrical Engineers opened on Tuesday, April 25th, at the Hotel Alexandria, with a large initial attendance. The first meeting was called to order at 11 o'clock by the chairman of the Los Angeles Section, Mr. J. E. MacDonald. In a few words he introduced



Ralph W. Pope.

Ralph L. Mershon.

Mayor George Alexander, who gave a short, but appropriate speech welcoming the delegation to Los Angeles. In part he said: "We have come to realize electricity as one of the greatest inventions of man and even now we look towards its use to accomplish many things which must be done for us. In a short time we may expect its use in the home, to displace all drudgery; we will cook, wash and run our sewing machines with it. I can remember, forty years ago, when our only electrical men were the telegraph operators and even but few of these could work by sound only, but required the tape and recording instruments. Our city can develop 120,000 h.p. in electrical energy from its water-power and there are many more opportunities outside of this. This is to be used in the homes and we have the best country in the world for homes."

The chairman, with a short introduction, appointed Mr. Ralph D. Mershon as temporary chairman.

The first paper read was that of Mr. O. D. Ensign and Jas. M. Gaylord, on "Transmission Applied to Irrigation." Mr. Ensign did not read the paper, which

Lobby Hotel Alexandria, Los Angeles.

is devoted to a description of the Minidoka irrigation and power project in Idaho and the Salt River project, in Arizona, both built by the United States Reclamation Service, of which Messrs. Ensign and Gaylord are engineers. Those papers are valuable, in that they not only describe the systems but gives much valuable data on costs.

Regarding irrigation, Mr. Ensign stated that the actual cost of irrigating 50,000 acres was $1.50 per acre per annum, and the construction charge about $40 per acre, including the proportionate cost of power canals and controlling works at the laterals.

Mr. Ensign spoke briefly on a number of government projects not described in the paper. In the development of irrigation works natural power sites are often created by diversion works. The law is so broad that it allows the Reclamation Service to develop available power and utilize it for pumping.

The new runners in the turbine at the Roosevelt Dam power-house have increased the unit capacity from 6500, as reported, to 7500 kw., as corrected.

Discussion on Transmission Papers.

The paper by Mr. R. J. C. Wood on "Transmission Systems, from an Operating Standpoint," was next read by the author. The discussion on both transmission papers was opened by Mr. A. H. Babcock, who asked a number of questions as to more definite data on the proper use of capacity formulas in line calculation, also as to the probability of more than one wire of a line breaking at one time. He said that there had been criticism of the high tension conductors in the Fruitvale power house of the Southern Pacific Company, and thought that future changes would justify this action.

C. L. Cory commented on the fact that a less permanent form of construction than that described by Messrs. Ensign and Gaylord was often permissible in private irrigation plants whose load had not yet been developed. He also raised the question as to what is to be done with the power from these plants during that part of the year when pumping is not necessary.

E. F. Scattergood remarked that information on bad features of operation was even more interesting than the good features. He also asked if there was anything that could prevent the Government from selling its surplus power.

Paul M. Downing corroborated Mr. Wood's unsatisfactory estimate of automatic regulators for voltage at the power house end. His experience shows that intelligent hand operation is more efficient. Mr. Downing disagreed with Mr. Wood's stricture of synchronous regulating apparatus on account of its first cost and advocated the use of synchronous condensers on lines carrying induction motors. He emphasized the seriousness of leakage as compared with the infrequency of lightning on the Pacific Coast.

Mr. Jas. A. Lighthipe spoke of the unexpected growth of loads for developed power and commented on the great increase in transmission voltages in recent years.

Ralph Bennet spoke of the use of 100,000 volts by the Great Western Power Company and of the advantages of tower support with suspension insulators over the old wooden poles and arms.

C. W. Koiner spoke of the value of the cost data in the paper on "Transmission as Applied to Irrigation," and its reasonableness as compared with the cost of rehabilitating Eastern farms and Southern plantations.

L. J. Corbett presented some interesting data on conditions in the Northwest, especially around Spokane. He stated that 100 days is the usual length of the irrigation season in that vicinity.

Ralph D. Mershon, the chairman, warned against the use of a high voltage except where it is economically justified and emphasized its folly on lines which distribute more power to small consumers than is transmitted to more distant ones. He spoke of the success obtained with the horn type of lightning arresters and graded gaps in the East. He also described Mr. L. C. Nicholson's method of removing a short circuit from the line by short-circuiting the generating station and then removing it in less than five cycles. This is automatically done by flap switches or leaf steel springs bent back to a tension of thirty pounds and released by triggers in case of a short. After the switch is sprung an expulsion fuse breaks the short circuit thus created. He questioned the depth from which water can be profitably pumped and spoke of the danger of a pump robbing neighboring ground. This latter point was more extensively discussed by Mr. Lighthipe.

In closing the discussion Mr. Ensign emphasized the necessity for concrete construction. He stated that the economic depth of pumping depended upon the crop to be irrigated, being profitably conducted at 200 ft. for oranges and only 30 ft. for alfalfa. As the power is usually developed by the water being used for irrigation there is seldom any power developed in the seasons of no irrigation. Where surplus power is generated, as at the Minidoka project, it is sold at a low rate to encourage the development of the surrounding territory. Mr. Ensign also gave an exhaustive summary of the irrigation law and its workings.

Mr. R. J. C. Wood, in closing the discussion on his paper, stated that the approximate formula for calculating transmission lines was applicable up to 150 mile lines, beyond which the accurate formula should be used as a correction. Experience shows that more than one wire seldom breaks before the power can be switched off. He suggested an amperage rating for switches as being preferable to a kilowatt basis. Adjournment was then taken.

Electric Furnaces.

At the afternoon session, after some introductory remarks by Secretary Pope, C. F. Elwell's paper on "The Refining of Iron and Steel by Induction Type Furnaces," in the absence of the author, was read by C. W. Koiner. Brief discussions were given by R. W. Van Norden, E. W. Paul, J. J. Frank, H. H. Sinclair, R. W. Sorenson, C. W. Koiner and Budd Frankfield, consisting most of queries which were not satisfactorily answered in the absence of the author.

Ciscoidal Oscillations.

Under the temporary chairmanship of K. B. Miller, Mr. Campbell's paper on "Ciscoidal Oscillations" was read by title.

C. L. Cory gave an able and comprehensive explanation of the theory of ciscoidal oscillations in

simplified language. Temporary Chairman K. B. Miller believes that this paper is a classic and will be of great value in future telephone developments. It is like much of Maxwell's work in that it is ahead of its time.

Redondo Trip.

On Tuesday afternoon adjournment was taken at 4:30 o'clock and a half hour later the members boarded a special train of the Los Angeles-Pacific Railway, the objective point being Redondo Beach where dinner was to be served and a visit made to the modern generating plant of the Pacific Light & Power Company. A round-about route was chosen, passing through the beautiful residence suburb of Hollywood, the Soldiers' Home, Santa Monica, Ocean Park, Venice, and the string of gay beach towns between those points and Redondo.

Upon arrival at Redondo, the party of about 120 spent nearly an hour in examining the power plant. This plant has a generating capacity of about 30,000 kw. and is interesting in that it illustrates the sweeping progress that has been made in changing from reciprocating engines to turbines. Built two years ago, this plant was equipped with 3 four-cylinder, cross compound Corliss engines driving 5000 kw. 3-phase 18,000 volt generators. This plant when installed was said to represent the very highest progress in reciprocating engine design and the test efficiencies reported were uncommonly high. During the last year, the plant has been overhauled and enlarged and two 12,000 kw. Curtis turbine driven vertical sets have been installed. Each one of these machines is capable of delivering as much power as the combined output of the three older sets and both together occupy only about as much space vertically and horizontally as one of the older sets. Much interest was manifested in the intake for condenser water from the ocean and the new pumping plant installed in connection therewith.

By the time the crowd were again gathered together it did not require much persuasion on the part of the party leaders to get them to the pavilion on the beach where a good dinner was ready. All were seated by eight o'clock and the well served meal was greatly enjoyed with the accompaniment of much fun and joshing.

Mr. McDonald acted as toastmaster and called on a number of those present to respond. Among those who spoke were Messrs Lighthipe, Babcock, Pope, Mershon, Cory and Foster. The speeches, while full of fun and wit of the scintillating variety, such as is inspirited by the various "juices" with which electrical engineers are most familiar, were also more or less dignified and instructive. At eleven o'clock the party boarded the "special" for the return trip to Los Angeles.

Telephone Papers.

The second day's session was called to order at 10:00 a. m. by the temporary chairman, Mr. K. B. Miller. The paper by Mr. Chas. S. Winston on "New Automatic Telephone Equipment, was presented by the author. This paper is a technical description of a modern automatic system.

Chairman Miller remarked that this paper is a frank discussion of apparatus not yet in general use and work regarding which the developers generally wish to keep silent. The paper is directed more to the semi-automatic system. Mr. Edward D. Clement was then introduced.

The paper by Mr. Clement on "The Semi-Automatic Method of Handling Telephonic traffic," was then read.

The sole purpose of developing the auto-manual systems is to develop economies. Telephone development having been very wasteful; does away with branch exchanges, bringing all operations to one point.

The paper was read, very full interpretations were given in going into more detail to explain apparatus and amplify the reasons for all devices used.

The system is absolutely secret, as the operator after calling the party is automatically disconnected from the subscribers and has no further control over them. Adjournment for lunch was then taken.

The afternoon session was called to order by Mr. Miller, temporary chairman of the telephone committee.

The paper by Mr. Brown on "Some Recent Developments in Railway Telephony," was given by the author. This was deemed advisable before discussing the two previous telephone papers. Mr. Brown abstracted his paper, explaining details to some length.

Chairman K. B. Miller, in introducing the discussion on the telephone papers, divided it into two sections, the automatic and the automanual systems, and the railway telephone paper.

J. W. Gilkyson, as the Los Angeles manager of the manual system, did not wish to malign the automatic method, but believes that the semi-automatic will be the neutral factor in ultimately bringing the other two together.

Leo Keller, chief engineer of the Los Angeles Home Telephone Company, quoted from a letter from a German correspondent, in which he describes the installation of a half-automatic exchange in Amsterdam with the view of ultimately making it full automatic. His view of the local situation is that the semi-automatic is but a step toward the full automatic.

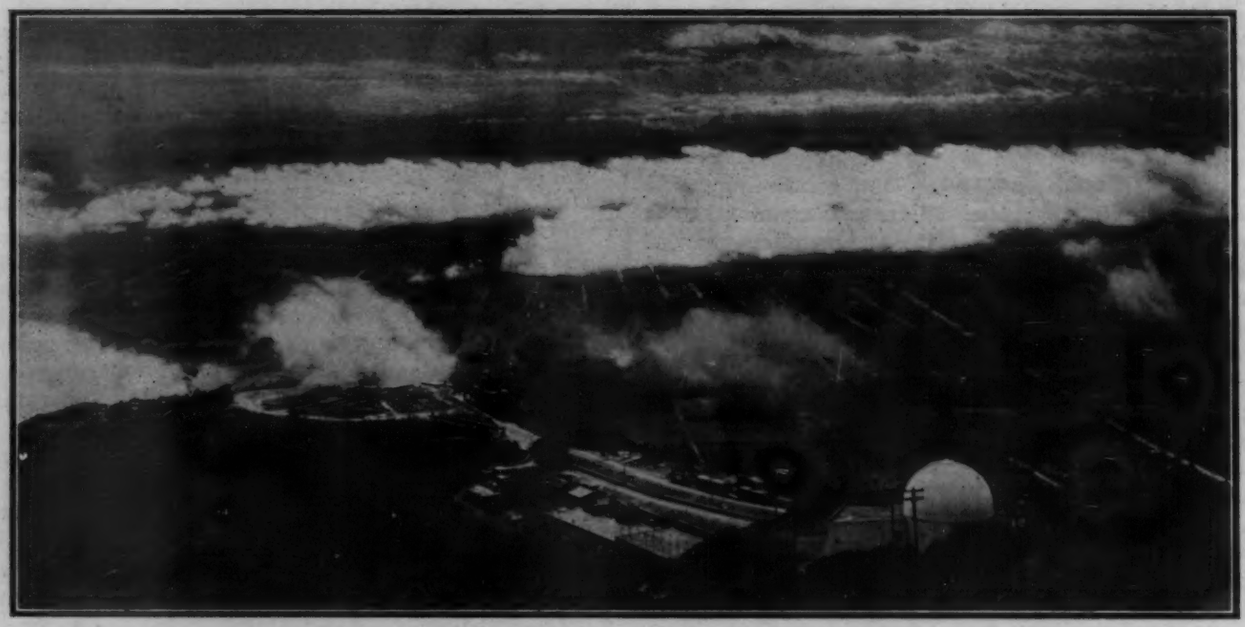
A. H. Griswold stated the main object of a telephone company was to provide service that is reliable, efficient and popular. The question of providing the best type of equipment at the least ultimate cost is secondary to giving the public what they want. He asked information as to how calls could be reverted in the automanual system and as to how simultaneous connections were provided for.

H. A. Foster spoke of the advantages of the manual system and the liability for mistakes with the automatic.

A. H. Babcock, speaking as a subscriber, and not as an engineer, spoke of the central as the weak link in the chain of the manual system, because of the mistakes that she is continually making.

R. W. Pope commented on the satisfactory operation of private branch exchanges in the New York manual system.

J. W. Gilkyson called attention to the fact that in the manual system all mistakes are charged to the operator and that like mistakes on the part of the



View of Echo Mountain and Pasadena from Mt. Lowe Above the Clouds.

subscriber are overlooked. An abrupt man is likely to get poorer service than one who is courteous.

Mr. Newell spoke of the advantages of the automatic with a foreign population. Leo. Keller corroborated his views.

W. D. Moore described the operation of the observation board that automatically shows when the subscriber takes the receiver, when the operator plugs in to answer, the moment she rings, the moment the subscriber takes the receiver to answer, the moment he hangs up and the moment the disconnection is made. This shows, among other things, that but 0.1 per cent of the entire number of connections completed were rung in error. Mr. Moore thinks that the automatic will be the stepping stone to the semi-automatic in the larger cities where busy men do not care to manipulate the instruments themselves. Smaller cities can be well served by the automatic.

Mr. Schuler of Santa Barbara spoke of the better service given by the semi-automatic because, as shown by a personal canvas, a large percentage of subscribers preferred to give the number to the operator.

Mt. Lowe Trip.

H. B. Tupper explained the use of automatic stick-down keys in the manual system, whereby the subscriber can easily notify the operator of failure in making a connection.

The second day session terminated at 4:00 p. m. as the second outing which had been planned for the members of the convention and their ladies followed. The party numbering about 150 gathered at the depot of the Pacific Electric Railway, and at 5:00 o'clock boarded special cars to be taken to the Alpine Tavern on Mt. Lowe.

This trip took the party through the cities of Pasadena and Altadena, and aside from showing many beautiful homes and lovely landscapes, gave the engineers an opportunity to observe what is perhaps the finest piece of interurban railroad in the world.

The cars were left at Rubio canyon, one of the many rugged gulches of the San Gabriel range, and at an elevation above sea level of about 2300 ft. Here transfer was made to the famous incline road which follows the precipitous slope of Echo Mountain to its summit where is situated the Lowe observatory. This incline is operated by a 1¼ in. steel cable, there being two cars, fastened to either end of the cable, the one ascending as the other descends. The total length of this incline is 3000 ft. and the vertical rise, 1700 ft., and the grade at the steepest part is 63 per cent.

From Echo Mountain to the Alpine Tavern, the line is nominally an ordinary trolley road, having a gauge of 36 in. A ride over this road however will convince the engineer that there is nothing ordinary about it as the many difficult engineering problems are thoroughly impressed upon those who may be fortunate enough to take the trip.

The Alpine Tavern is at an altitude of over 5000 ft. and the members of the party found the huge fireplace and hospitable welcome much to their liking. Dinner was ready for the hungry party, and all agreed that no mistake had been made in coming to this famous resort. There was no attempt at speech-making as the time for return was limited, therefore, after a big dinner, the cars were again entered and the descent begun.

Upon arriving again at Echo Mountain, the night panorama of the San Gabriel valley was spread out far below. In the foreground, but far below, the myriad lights of Pasadena sparkled and glistened like an inverted firmament, much farther the lights of Los Angeles could be seen, and still farther at distances of fifty miles or more, the glow of lights from the many beaches on the Pacific Ocean could be distinguished.

The party arrived in Los Angeles, late in the evening, tired but happy.

Telephone Discussion.

The telephone discussion was concluded on Thursday morning with K. B. Miller acting as chairman. He spoke of the importance of railway dispatching by means of the telephone and suggested the advisability of a separate circuit for operating the selective

bells on the dispatching system instead of loading on already overloaded circuit with selective ringing apparatus as well as a multiplicity of talking circuits.

L. B. Cramer questioned whether time is saved by the arrangement permitting the signalling to be interrupted for conversation. He recommended larger calling bells and even an auxiliary bell for this purpose. He spoke of the tendency to plug the talking button. He also compared two makes of retardation coils, and spoke of the efforts of telegraph operators to hamper telephone dispatching.

Ralph Bennett asked whether selective apparatus could be designed to work in the presence of high voltage transmission lines.

R. W. Pope recalled early experiences with the telegraph and its advantages in receiving by sound without the necessity of holding a receiver to the ear.

K. B. Miller also spoke of the dispatcher's objection to wearing a harness, and of the failure of loud-speaking telephones.

C. F. Elwell told of the successful use of telephones for train dispatching in Australia ten years ago by means of code ringing.

S. G. McMeen showed that a well-balanced telephone line is not affected by external transmission lines.

J. A. Lighthipe traced the early difficulties in the manufacture and use of telephone equipment, contributing some interesting personal experiences.

S. J. Lisberger described an automatic dispatching telephone system for electric sub-stations in use in San Francisco.

Chas. S. Winston, in closing the discussion on "New Automatic Telephone Equipment," stated that no satisfactory means of reverting calls on a two-wire automatic system has yet been devised, but that little trouble has been experienced because of their infrequency. The chance of two subscribers plugging in on the same line simultaneously is small and this is not likely to cause trouble. He also spoke of the difficulty of handling measured service with automatic equipment. While service is important it is subsidiary to cost of installation.

Edward C. Clement spoke of the pioneer work of Americans in the telephone field. He stated that the automanual was an attempt to give the subscribers the individual attention of an operator at a minimum cost to the company. This system relieves the operator from much strain and reduces the number of complaints. Measured service is possible by means of the telechrometer, which is based upon a logical plan to show the total time and distance talked during a month.

Gregory Brown did not think it necessary to have a separate signalling wire as the high impedance of selectors do not materially load the line. Various simple arrangements allow ringing till answer is given. A satisfactory loud-speaking instrument will undoubtedly soon be developed. Repeating and writing all dispatching orders is sufficient safeguard against accidents.

S. G. McMeen expressed the thanks of the telegraphy and telephony committee for the prompt work, forbearance, patience and attendance of the authors of the telephone papers. Chairman A. E. McDonald expressed the thanks of the Institute for Mr. McMeen's hard work in getting together the material for the meeting.

Continuity of Service in Transmission Systems.

R. J. C. Wood suggested that instead of opening a short circuit, with its attendant danger of burning the line in two, that it is better practice to lower the voltage and thus clear the short circuit. Cutting in on the line every thirty seconds would severely tax the generators and transformers. He inquired as to the success with electrolytic lightning arresters and as to the size of the insulators. With regard to locating trouble on the lines he wanted to know if the operator plugs the line in on the bus.

P. M. Downing complimented the author on his honesty in tabulating interruptions to service and giving their causes. He commented on the few instances of poles burning out due to leakage over the insulators and spoke of the lack of a satisfactory device for automatically cutting out a line in trouble. Reverse current relays are inadequate when the voltage drops below a certain point. An ordinary induction wattmeter with the disc fixed so that as the current reverses the meter will turn in the opposite direction will indicate in which direction the current is fed and thus shows the line in trouble.

E. F. Scattergood agreed with the practice of tying the generating stations solidly to the transmission lines and not using automatic devices, which are likely to go out together and cause more trouble than they prevent.

G. H. Stockbridge, in speaking on the subject of running the two lines parallel through automatic switches in the substations, asked if experiments had been made on similar paralleling at the generating station. When two lines are running on the same poles he finds it essential that the inspecting lineman ground both ends of the circuit. The burning of poles with the type of insulator employed can be largely eliminated by placing a piece of galvanized iron on top of the lower cross-arm to provide a conductor for the leakage current. Local experience with air gaps has been somewhat unsatisfactory. The discharge point varies greatly with atmospheric conditions, while safe in dry weather it discharges in foggy weather.

Rudolph W. Van Norden spoke of the similarity of problems in operating different plants which should form the best guide for the designing engineer. He instanced particularly the successful Pacific Coast experience with non-automatic apparatus.

C. O. Poole spoke of several features in the Snoqualmie system which illustrates points upon which he has often debated. As to the segregation of multiple circuits by automatic switches he believes that a good non-automatic is much better than a poor automatic. The practice in Southern Nevada has been to install automatic oil circuit breakers on branch lines and also to protect substation devices. These are more reliable on the high-tension than on the low-tension side. He inquired as to whether the circuit breakers would drop after a short circuit due to the line or capacity reactance and as to the method of testing the line, also as to what type of ammeters were used on the high-tension side.

Ralph Bennett stated that when safety devices were installed on the high-tension side of a delta-connected 100,000-volt system, the surges broke down

the installation. They have experienced little or no trouble at such high voltage.

C. L. Cory also spoke of the value of these definite and accurate records operating facts in arriving at effective conclusions.

Electricity in the Lumber Industry.

E. J. Barry's paper on "Electricity in the Lumber Industry," in the absence of the author was read by R. W. Sorenson.

R. L. Noggle spoke of the saving in insurance costs accomplished by substituting electrical drive for engine drive in sawmills.

J. A. Lighthipe inquired whether a portable electric saw had yet been devised for the logging camp.

C. Pemschel in a written communication asked for further data on the mill operation, the size of the cut and the feed as well as the edgers. He questioned the use of 75 h.p. motors in driving the planers unless operated as a group.

J. A. Lighthipe and Chairman MacDonald cited a number of instances which proved that 75 h.p. was not too much to drive a planer in a rough lumber camp.

Ralph Bennett cited an electric-driven sawmill installation using 30 h.p. to drive the planers. He also described the conditions at a redwood mill in Southern California. Monorail systems are preferable to storage battery yard locomotives.

Power Diagram Indicator.

Professor Harris J. Ryan briefly explained the theory, construction and purposes of his power diagram indicator for high-tension circuits, Ralph L. Mershon acting as temporary chairman.

E. F. Scattergood inquired as to the practicability and portability of the instrument outside of the laboratory.

C. L. Cory spoke of its value in measuring very small values and showed that the ability to measure .03 watt at 9000 volts corresponded to one-three-hundred-thousandth of an ampere. He traced its analogy to the steam engine indicator and indicated its practical applications.

J. J. Frank pointed out the value of the instrument in measuring losses at high potentials because of its recognition of the wave-shape, which is not done by the spark-gap.

R. L. Mershon asked information on a simple method of obtaining a known load to calibrate the instrument. He wished to know if measurements had been made as to the effect of moisture on the corona. He also expressed his admiration for the paper and the work it evidences. He sees in it particularly a valuable start in the solution of the insulation problem, which seems to depend upon getting away from organic materials.

Professor Ryan stated that arrangements had been made for manufacturing the instrument in a fairly portable form. He explained how by means of a synchronously revolving mirror it can be used to study wave-forms and briefly answered the other questions which had been asked.

Professor Ryan then abstracted Professor Adams' paper on the economy and limiting value of voltages as illustrated in a number of curves shown.

Mr. A. H. Babcock then took charge as temporary chairman while a paper was read descriptive of the 1200-volt railway of the Central California Traction Company as written by S. L. Napthally.

C. H. Masson told of the inception of this road and Ralph Bennett also spoke briefly.

The Status of the Consulting Engineer.

Chairman A. H. Babcock at this point introduced a subject which was touched upon by Mr. L. B. Stillwell in the meeting at San Francisco a year ago, on the growing tendency of the manufacturing companies doing consulting engineering work free of charge for their customers. The reasons given for this is that in the beginning there were no college courses covering this work as there was no science to be taught. All investigation and experimental work was carried on in the factories, the only places where information could be secured. The manufacturers have therefore become accustomed to furnishing charts with all sorts of information. President Stillwell's remarks led some to believe that some sort of concerted action would be taken in the East if not in the West to change this relation between manufacturer and purchaser.

Mr. Mershon advanced the opinion that no action had so far been taken. He expressed the opinion that it was an economic subject, that if the consulting engineer be an economic superfluity, he at least should get out of the business. The question is therefore is or is he not an economic superfluity. If not, something should be done at once.

Manufacturers are heartily in favor of having work done by the consultant, as the expense of this work where they have to bear it, is heavy. Concerted action is necessary either to abolish this free work or make a regular schedule of charges.

Recently there has been organized the American Institute of Consulting Engineers, they should take this question up carefully if they show that their existence is justified then they should take up the matter with the manufacturers. Many of the engineers in the employ of the manufacturers expect eventually to go into independent consulting work, if there is no work for them to do another complication is introduced.

Mr. Mershon explained that what he said was not in extenuation of the cause of the consulting engineer but to set engineers thinking on a proper solution of the problem, either for or against.

Mr. Babcock then took up the subject from the point of the engineering student. He said that college graduates were not, as a rule, self-reliant enough to succeed in their work, in other words there must be a period of several years of seasoning. It is perfectly natural for the young engineer to lean toward the manufacturer for his sources of information and eventually become dependent on him. The manufacturer in turn expects something. This is absolutely destructive to independent thought and action. Good character is the only guide as to how far it is right to depend on the manufacturer, in other words a man's conscience must tell him what to do.

Mr. Ensign gave examples of where bids for equipment differed greatly and how an absolute knowledge of conditions governing the situation was necessary on the engineer's part to form a decision. Mr. Scattergood, brought out the point that the profession as a

profession had a purpose and should not be controlled by industrial conditions. He showed where engineering work for a company done by its own engineer will give better results than that done by the engineer of the manufacturer who is building apparatus for the company. One reason is that the manufacturer is too far away and his engineer is not familiar with the local conditions, the other is that his greatest enthusiasm is naturally toward the manufacturer, his employer is an influence which prevents the sort of development work and healthy conditions toward the company which would otherwise prevail. Corporation engineers are continually being imposed upon through friendship to members of the corporation or otherwise. These people get free advice and then employ cheap and poor talent to carry out work. Here however the corporation engineer has the opportunity to refer the applicant to a consulting engineer, thus saving his time and putting the work where it legitimately belongs.

Mr. Scattergood hoped that the same free expression of opinion on this subject would prevail in Eastern meetings.

Professor Harris J. Ryan of Stanford University then took up the matter, as relating to college work. He said that the co-operation of consulting engineers with the college men was of greatest importance, especially in tiding over the two or three years of uncertainty after graduation. The manufacturers are of great help here and the work in the factories gives experience and reliance. The colleges are trying to prepare the student to safely cross this time of uncertainty and welcome co-operation.

Mr. Babcock gave instances of his advice to college men who applied for positions with his company. He said that he told them to take the students' course with a manufacturing company for two years and then bring in his application.

Chairman McDonald then took the chair and in a few well chosen words thanked the members for their eager participation in the discussions, etc.

Mr. Mershon remarked that if the presence of the eastern members were necessary to the success of these meetings, he hoped that condition would continue to obtain.

Mr. Scattergood reiterated his belief in the importance of these meetings and regretted that President Jackson could not have attended.

The chairman called attention to several letters from members regretting their inability to attend and read one in particular from President Jackson.

Letters were also received from Messrs. L. B. Stillwell, Sprague, Murray, Dunn and Jackson of Chicago. The convention was then adjourned with instruction to the members to meet the following morning at 8:30 at the Arcade depot of the Southern Pacific for an all-day trip to the Edison Company's plant in San Bernardino County.

The Riverside Trip.

The last day of the session was given entirely to entertainment and from this point of view was destined to be the crowning event. For this day the members and their wives and ladies were to be guests of the Southern California Edison Company.

The party boarded a special train of four cars on the Southern Pacific road, at 8:30 a. m. There were 220 all told and it made a merry train load. The ride of two hours through the San Gabriel Valley, through the orange orchards was a source of constant admiration to those who had never been through the section. At Pasadena a brass band welcomed the special with lively tunes, and hundreds of oranges and masses of roses were distributed to the party.

The party passed through the city of Redlands and disembarked at the Union Ice Co.'s plant near Mentone. A short visit was made here for the purpose of viewing the first three-phase synchronous motor ever built. This motor drives an ice-machine and has been in daily operation for 17 years. The development of long-distance transmission started at this point and the motor was naturally of great historical interest to the engineers present.

Waiting for the party at this point were automobiles, tallyhoes, carry-alls, and almost every sort of comfortable conveyance which could be procured in the county, for the transportation of the party to the power plants, about thirty conveyances in all. From this point the drive was through a wild uncultivated country, following a steady rise, a distance of six miles. The drive while slow, was a delight as the day was perfect, the air clear and the view of the mountains, culminating in the peak of San Jacinto a magnificent spectacle not soon to be forgotten.

The party then left to retrace part of the way to Mill Creek No. 1 where lunch was served. And about this time the lunch was more important than all of the power houses on earth. It was a wonderful lunch. Spread out in two long lines under the trees were the tables and on them was almost everything, at least it looked that way. First there was fried chicken, it was said that one hundred and forty-five of them were served, then there were cold meats of all sorts, all one could eat, then there was asparagus and olives, and salads and hot biscuits and finally real good old-fashioned strawberry short-cake, big plates of it with lots of strawberries.. It is rumored that several of the San Francisco delegation who were sitting near the heads of the tables, after they had finished all they were supposed to eat, went down to the other ends, pretending they were late comers and had lunch all over again.

The return was made through the orange groves to Redlands where the special train was in waiting.

The hosts had arranged many pleasant surprises for the benefit of the party, but here Mr. Lighthipe gathered the party together and then ordered a special eclipse of the sun for their benefit, which was greatly appreciated.

The special was again boarded and the party was landed at Riverside, going to the "Mission Inn" for dinner and entertainment.

It was with the greatest reluctance that the party dragged themselves away at 9:00 o'clock to again enter the special for the return.

Stragglers late that night stopped to look and listen to the happy crowd which filed through the Arcade depot, all swelling the chorus of "Auld Lang Syne," a reflection of the pleasure afforded by the hosts under the care and leadership of Mr. J. A. Lighthipe and B. F. Pierson.

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NOTICE TO ADVERTISERS

Changes of advertising copy should reach this office *ten days in advance of date of issue.* New advertisements will be accepted up to noon of Monday dated Saturday of the same week. Where proof is to be returned for approval, Eastern advertisers should mail copy at least thirty days in advance of date of issue.

Entered as second-class matter at the San Francisco Post Office as "The Electrical Journal," July 1895.
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Consulting Engineers Not an Economic Superfluity

An impromptu discussion during the Institute meeting at Los Angeles regarding the sales engineer's encroachment into the consultant's practice was ably epitomized by Ralph L. Mershon in the leading question, "Is the consulting engineer an economic superfluity?" The answer to this impersonal query is vital to the future of engineering development; it can be solved by an equally unsentimental analysis of existing conditions, for it requires merely proof of the fact that there is work for the consulting engineer and that he is the best qualified for its performance.

If judgment were based upon the recent idleness of many of the profession, it might seem that they are not needed for much of the engineering work now being done; or at least that the men paying for the work do not recognize the important function of the consultant as distinguished from the sales engineer who supplies apparatus or from the operator who runs it. It can be but a matter of a few years, however, before the mistakes thus made may demand competent rectification and engineers will be as busy patching the old as planning the new work.

The consulting engineer is a judge, not an advocate. He is as likely to advise against as in favor of a project. If his opinion is favorable it is his province to devise the most feasible method of development. He must be able to form a mental image of the completed installation as an artist does of a picture he has yet to paint. His skill consists in the pre-determination of equipment and methods. He is necessarily a man of broad and varied experience and possessed of a specialized knowledge which guides him in untried fields and enables him to meet unusual conditions.

The engineer for the manufacturer is as obviously unfitted for such discrimination as is the attorney for the defense disqualified from charging the jury. Yet in his limited field the salesman with engineering knowledge can be of great value to the purchasing client because he knows what apparatus is best adapted to certain needs. The fault, if there be any, lies not with the sales engineer, but with the buyer who is not as familiar with engineering as with law, and who consequently does not realize that while he may confer with the salesman he should consult with an independent engineer.

The work of the consulting engineer is as important and distinctive as that of a federal judge or of an architect. His horizon is broader than that of the specializing salesmen and his judgment is correspondingly sounder. He is most emphatically not an economic superfluity, for without him all methods of developing material resources would be decided not by reason, but by sentiment induced by partisan argument.

PERSONALS.

John A. Britton and wife sailed for Honolulu this week.

A. C. Balch of Los Angeles was a San Francisco visitor last Monday.

Thomas Mirk, of Hunt, Mirk & Co., left for San Diego last Monday.

A. D. Page, manager of lamp sales for the General Electric Company, is at Seattle.

Rufus W. Keeler, electrician, recently returned to San Francisco after an Eastern trip.

T. G. Whaling of the Westinghouse Lamp Company returned to New York from the Pacific Coast.

J. B. Hunter, the City Engineer of Denver, Colo., arrived at San Francisco last week on a vacation trip.

R. D. Holabird of the Holabird-Reynolds Electric Company of San Francisco is making a month's trip East.

A. S. Work, representing the Railroad Supply Company at Sacramento, was at San Francisco last Saturday.

Robert Kuhn of the American Electric Heater Company left for Detroit this week, going via Los Angeles.

Guy W. Talbot has been elected president of the Pacific Power & Light Company, with offices at Portland, Ore.

W. W. Low of the Electrical Appliance Company of Chicago sailed from San Francisco last Wednesday for Honolulu.

C. I. Hills of the Franklin Incandescent Lamp Company of New York left during the past week for the East, via Seattle.

Gilbert Woodill of the Woodill-Hulse Electric Company, Los Angeles, spent a few days at San Francisco during the past week.

W. H. Powell, chief electrical engineer of the Allis-Chalmers Company, is visiting the San Francisco office of that corporation.

K. G. Dunn, electrical engineer with Hunt, Mirk & Co., returned to San Francisco last Tuesday after a trip covering Portland, Seattle and Aberdeen, Wash.

H. L. Jackman, general manager of the Humboldt Gas & Electric Company, which is now owned by the H. M. Byllesby interests, recently arrived at San Francisco from Eureka.

C. S. S. Forney, president of the Southern Counties Gas Company, operating plants at Covina, Fullerton, Orange, Anaheim and other towns in Southern California, is at San Francisco.

Williams S. Turner, formerly manager of the Northwestern offices of W. S. Barstow & Co., has opened offices as consulting electrical engineer, in the Spaulding Building, Portland, Ore.

M. L. Dozier, who recently resigned as assistant general manager of the Northern Electric Railroad Company, recently visited San Francisco. He will engage in business for himself at Sacramento.

J. B. Rowray has resigned as superintendent of the north division of the Pacific Electric Railway of Los Angeles to become superintendent of the Northern Electric Railway of Chico, Cal.

L. B. Cramer, electrical engineer of the Oregon Electric Railway Co., inspected the high-tension power plants of San Francisco and vicinity after attending the American Institute sessions at Los Angeles, and departed last Monday for Portland.

J. D. Schuyler, a hydraulic engineer of Los Angeles, who has been connected with important hydroelectric projects on the Pacific Coast and in foreign countries, was a San Francisco visitor last week.

C. W. Koiner, of Pasadena, has been engaged by the City of San Bernardino, Cal., to value the power plant and distributing system of the Lytle Creek Power Co., with a view to purchasing the property.

Louis C. Kelsey, civil engineer, Selling Building, Portland, Ore., has been employed by the city of Elma, Wash., to prepare plans, specifications and estimates for increasing the water supply by means of pumping. Bids for construction will be invited later.

Paul C. Funk, formerly superintendent of the gas department of the Coast Counties Light & Power Company, and more recently manager of the Tonopah Gas Company, is now with Van E. Britton, gas engineer, as construction foreman, at Willows, Cal.

A. M. Hunt has been appointed by the San Francisco Board of Works as consulting engineer, at a salary of $300 a month, to direct the construction of the Geary-street municipal railroad. He assisted in the preparation of the original electric railway data when the project was first taken under consideration several years ago.

The Electric Club of San Francisco, which is composed principally of United Railroads power station operators, gave an annual banquet on Monday, April 24th. Mr. W. T. Bivins, Chief Engineer of Electrical Equipment of the United Railroads of San Francisco, was their guest. The members present were: F. W. Bruckmann, O. E. Davis, J. L. French, H. L. Hiett, W. F. Lange, W. V. Smith, J. M. Williams, E. H. Zenner.

OBITUARY NOTICE.

Albert C. McDavid, who was well known in Central and Northern California as right-of-way agent for the Pacific Gas & Electric Company, died from heart failure at Smartsville a few days ago. He was 36 years of age and left a widow, who was formerly Miss Katherine Dyer of Sacramento. The remains were sent to McDavid's old home in Illinois for interment.

TRADE NOTES.

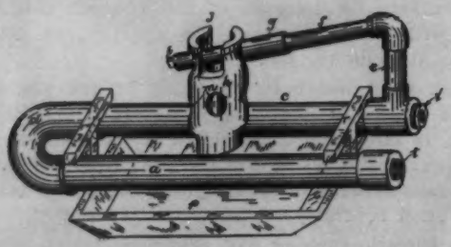
The Union Gas & Electric Company of Cincinnati has just placed with the General Electric Company at Schenectady, N. Y., the largest single order for arc lamps ever received by a manufacturer. This order calls for 6000 of the company's latest type of series luminous arc lamps, together with a complete mercury arc rectifier station equipment of 9000 lamps capacity.

The Pelton Water Wheel Company has been awarded the water wheel contral for the new "booster" installation for the municipal lighting system of Seattle, Wash. A 2500-h.p. Pelton-Francis turbine, of the overhung spiral-case type, operating at 720 r.p.m., under a head of 380 feet, will be installed. Water will be taken from the city reservoir at Volunteer Park and dropped to Lake Union, where the generating set will be located. It will be automatically controlled from a substation two miles away.

Van E. Britton is installing for the Northern California Power Company at their plant at Red Bluff a high pressure boosting system consisting of a Rix enclosed type compressor, motor driven with two storage tanks, and about a mile of high pressure pipe, which bisects the city, and is tied in at necessary points with the present low pressure distributing system by means of reducing governors. By means of this installation a constant and uniform pressure will be maintained at all times on the low pressure system regardless of the consumption.

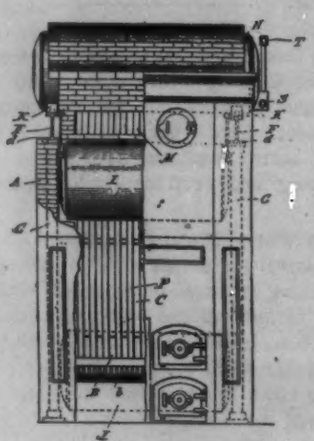
PATENTS

990,331. Hydrocarbon-Oil Burner. Charles W. Brewbaker and George R. Shanklin, Portland, Ore.; said Brewbaker assignor to Ella M. Brewbaker, Portland, Ore. In a hydrocarbon burner the combination of a retort consisting of a horizontally arranged U-shaped pipe, the parallel members thereof being spaced apart; a riser from said retort, a horizontal pipe-extension from such riser to approximately the center of the retort, the outer end of such pipe-extension being closed and having a bottom discharge orifice located centrally above the



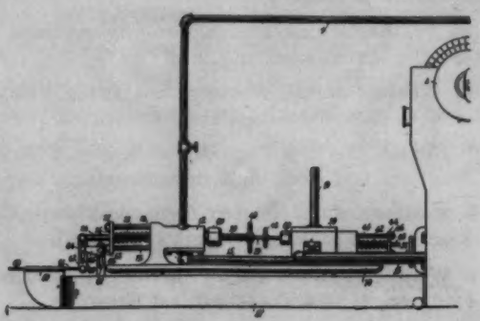
retort; a mixing chamber suspended from said horizontal pipe-extension of the retort and under the discharge orifice of said pipe-extension, said mixing chamber comprising a hollow body open at the bottom and provided with air apertures, one or more, in its sides; and a nipple of smaller cross section than the mixing chamber suspended centrally within the mixing chamber; the lower end of said nipple extending below the air apertures in the sides of the mixing chamber; and the parts being arranged to position the inlet end of the nipple below the orifice of the horizontal pipe-extension of the retort.

990,622. Steam-Generator. John P. Badenhausen, Seattle, Wash. A steam generator comprising uprights having longitudinally-disposed channeled seats at their upper ends, longitudinal beams superposed on the said uprights and disposed in the said channeled seats thereof, saddles resting on the said



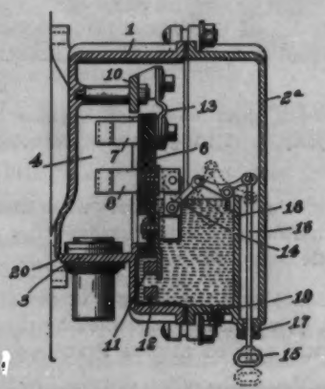
longitudinal beams, hangers connected with the beams, and spaced drums connected together and communicating with each other; one of the said drums resting in the said saddles, and another drum being connected to the said hangers.

990,744. Fuel-Oil Regulator. Edgar Mawer Jones, Morenci, Ariz. A fuel oil regulator, comprising a steam casing having an inlet and an outlet orifice; an oil casing having an inlet and an outlet orifice; slide valves mounted in said casings and arranged to close said outlet orifices; a connecting rod uniting said valves; a piston head mounted in a steam chamber in open communication with the pressure chamber connected with the surface to which fuel is being supplied through the said regulator; an air duct for supplying air to



said furnace; an intake valve for said duct; and means for operatively connecting said intake valve with said piston head to operate in unison with the said first mentioned valves.

990,235. Junction-Box Structure for Electrical Conductors. Charles W. Davis, Edgeworth, Pa., assignor to Standard Underground Cable Company, Pittsburg, Pa. A junction box for multiple-conductor cables consisting of a casing, a partition extending upward from the lowermost wall of the casing and dividing the space within, the space on one side of said



partition being further divided into a plurality of separate compartments, and an orifice for the introduction of a cable formed in the junction-box wall and opening into each of such compartments, and pole-pieces extending through said partition and into each of said compartments, substantially as described.

990,362. Impact Water-Wheel. John Kincaid, Vancouver, British Columbia, Canada. In an impact water wheel, a cup for the reception of the water jet the side of which cup into which the jet is received being approximately a spherical segment and thereafter in plan curving inward around the edge of the wheel to which the cups are secured toward the axis of rotation, and a series of sharp edged ridges in the bottom of the cup following generally the curvature of the outside edges of the cup.

INDUSTRIAL

A NEW TYPE OF SYNCHROSCOPE.

The infallibility and simplicity of the lamp method of synchronizing machines has kept it from being displaced by the rotating synchroscope. In fact, the rotating synchroscope is usually used in conjunction with a synchronizing lamp in order to guard against disaster in event of failure of the synchroscope. However, this arrangement is unsatisfactory, since it requires the attendant to divide his attention between two objects.

The lamp method, when the lamps are connected to synchronize light, gives an accurate indication of the equality of frequency, but the phase displacement which must be judged by the brightness of the light can be determined only in the roughest sort of a way. For instance, it requires a phase displacement of 16 degrees to produce a change in e. m. f. across the lamp of 1 per cent; therefore, a slight error in the judgment of the brightness of the light may cause considerable shock when the machine is thrown onto the line.

The Weston Electrical Instrument Company has recently brought out a new type of synchroscope, which is so combined with a synchronizing lamp as to be infallible and at the same time it gives precise indication of the phase difference between the two machines to be synchronized.

This synchroscope consists of an electrodynamometer movement similar to the new Weston single-phase wattmeter, which was described in our issue of April 15, 1911. The movable and fixed coils are both wound with fine wire; a condenser is connected in series with the movable coil and a slightly inductive resistor is connected in series with the fixed coil. This movement is combined with a synchronizing lamp mounted inside the case and behind the dial. The lamp is connected across the secondary of a special three-legged transformer, the primaries of which are connected to each of the circuits to be synchronized. The connections are shown in Fig. 4. The condenser, transformer and resistor are mounted in a separate box.

It is well-known that a good wattmeter will show no deflection, when the current and e. m. f. are in exact quadrature; that is, when the currents in its two circuits are in exact quadrature. In the present instrument, by properly choosing the constants of the two circuits the currents in these circuits can be brought into exact quadrature when the e. m. f.'s of the two machines are exactly in phase; that is, a good electrodynamometer movement when connected in this way is capable of handling phase coincidence with great accuracy.

With this arrangement alone there would be no way of distinguishing phase coincidence from phase opposition, and also no way of determining whether the incoming machine is fast or slow when the frequency is not right. In the Weston synchroscope these highly desirable characteristics are attained in a most ingenious way, namely: by mounting the pointer behind a translucent glass scale and illuminating it from behind with a small synchronizing lamp.

The pointer stands normally in the middle of the scale

Fig. 1. Front View Synchroscope.

Fig. 2. Phantom View.

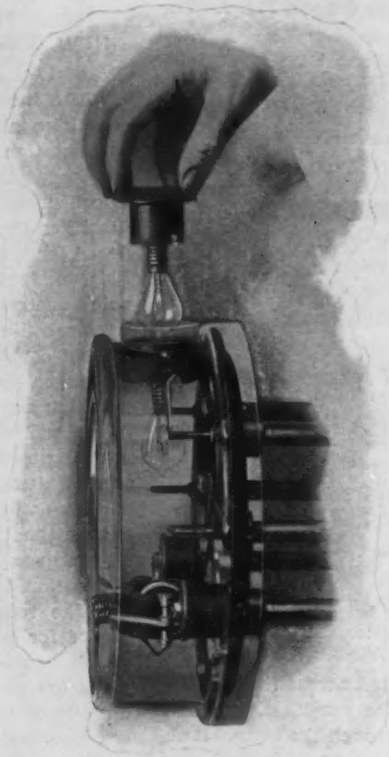


Fig. 3. Phantom view showing the relative position of the lamp, pointer and scale.

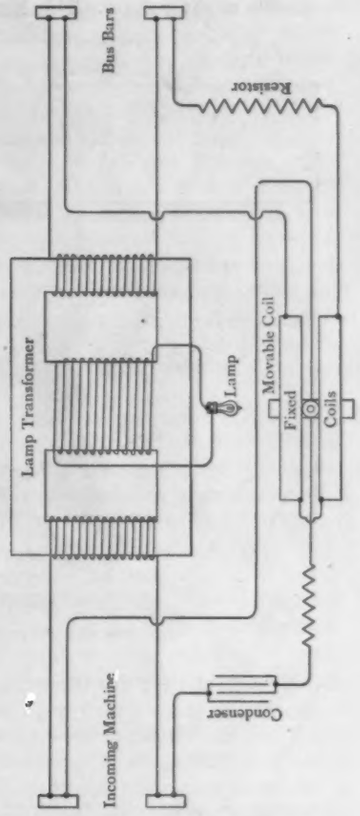


Fig. 4. Circuit diagram.

and is deflected to the right or left, depending upon the direction of the resultant torque; that is, upon whether the current in one circuit lags or leads with respect to that in the other. Therefore, when the frequency of the incoming machine differs from that of the line, the relative phase position of the two waves will vary continuously through complete cycles of 360 time degrees; each cycle corresponding to two reversals of the torque and thus the pointer will swing back and forth over the scale. However, on account of the lamp which glows only during that part of the cycle while the waves are in approximate phase coincidence, the pointer is seen only during every other swing; that is, it appears to rotate continuously in one direction or the other. The direction of apparent rotation depends on whether the incoming machine is fast or slow and the speed of rotation is a measure of the amount by which the frequency differs from that of the system.

It is not immediately apparent why the direction of apparent rotation indicates fast or slow. Probably the best way to demonstrate what goes on is to plot two waves that differ in frequency and then construct the torque curves which cause the motion of the pointer. This has been done in Fig. 5. The

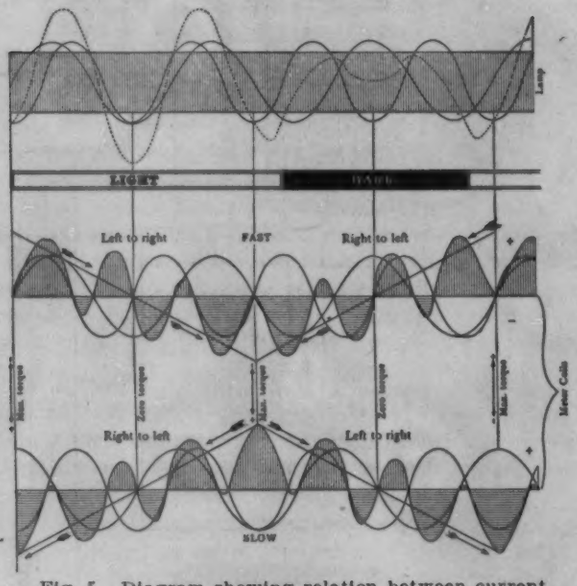


Fig. 5. Diagram showing relation between current torque, speed, phase, etc.

two waves at the top are those impressed across the two primaries of the lamp transformer and the resultant, which is shown dotted, represents the current through the lamp. It requires a certain value of current to make the lamp glow and it has been assumed that when the maximum value of the current does not fall outside the limits of the shaded area that the lamp would remain dark. The periods of light and darkness are shown below the top set of curves.

The middle set of curves is constructed from the upper set by assuming the fast wave to be that of the incoming machine, and, therefore, it is shifted ahead 90-time-degrees or a quarter period. These currents are active in the coils of the instrument and the torque is equal to their instantaneous product. These products have been taken and are plotted as curves bounding the shaded areas. It is seen that zero torque occurs simultaneously with maximum light and maximum darkness and that the maximum positive and negative torques occur at the transition points between light and darkness; therefore, the pointer is seen only while swinging to the right and appears to rotate in that direction when the incoming machine is fast.

The lower set of curves is exactly similar to the middle set, except that the slow wave has been considered as belonging to the incoming machine. In this case the pointer goes from right to left during the period of light. These indications are absolutely infallible, since the pointer can be seen only in shadow on the translucent glass scale by light from the synchronizing lamp.

When the frequency is right the torque will cease to fluctuate and the pointer will come to rest. The value of the torque depending upon the amount by which the e. m. fs. of the machines differ in phase. The deflection per unit phase displacement is large and fairly uniform, except at synchronism where it is very large. A displacement of 5 degrees from synchronism will produce a deflection of ½ inch.

The chief advantage of this synchroscope is its infallibility; however, it is also extremely accurate and convenient to use. There being no sliding contacts the rotation is smooth, steady and continuous up to the very instant of exact synchronism.

The accuracy is practically unaffected by changes in frequency and voltage over a wide range of variation. For instance, a 110-volt, 60-cycle synchroscope under test from 40 to 80 cycles and from 95 to 130 volts indicated true synchronism within 1 degree phase difference.

NEW WESTINGHOUSE ENGINE-DRIVEN INTERPOLE GENERATORS.

The increasing use of electric power demands overload capacities in direct-current generators, together with sparkless commutation and the highest degree of mechanical excellence. The new standard line of Westinghouse Type Q interpole direct-current generators thoroughly fulfills requirements and furnishes the most desirable engine-driven generator yet produced for direct-current two-wire or three-wire service.

Prominent characteristics of Type Q generators are interpole construction, thorough ventilation and ruggedness with relatively light weight. The interpole construction provides perfect commutation, with a definite brush position covering all ranges of load. Heavy overloads may be imposed without sparking or flashing and wear on commutators and brushes is reduced to a minimum. The ventilation of all current-carrying parts and of the armature cores of type Q machines is such that there can be no hot spots at points dangerous to the insulation. The frames are of cast steel, a material of high magnetic permeability, which furnishes ample strength with ecenomy of both weight and space, contributing to good ventilation, low freight charges and easy handling.

The rotors or armatures of type Q generators are designed for direct mounting on the shaft of the prime mover, which may be of any type of suitable speed. The stators or fields are arranged for mounting on masonry foundations or directly on the bedplate of the prime mover.

Ventilation has received particular attention in the design of these machines. The design of all the windings is such as to give shallow coils with the result that the heat in any part has but a very short distance to travel to the surface from which it is radiated. This, with very complete and thorough system of air circulation, insures an entire absence of hot spots and a uniformity of temperature never before obtained in similar machines. These features enable these generators to stand heavy overloads without injury.

Type Q generators are standardized for desirable and usual ratings from 25 kilowatts to 1000 kw. with speeds conforming to the best engine practice. Up to 100 kw. in capacity the standard voltages are 125 or 250. From 100 to 300 kw. these machines are wound for 125, 250 or 600 volts, and from 300 to 1000 kw. they are wound for 250 and 600 volts. Machines of 250-volt rating are regularly equipped for three-wire operation.

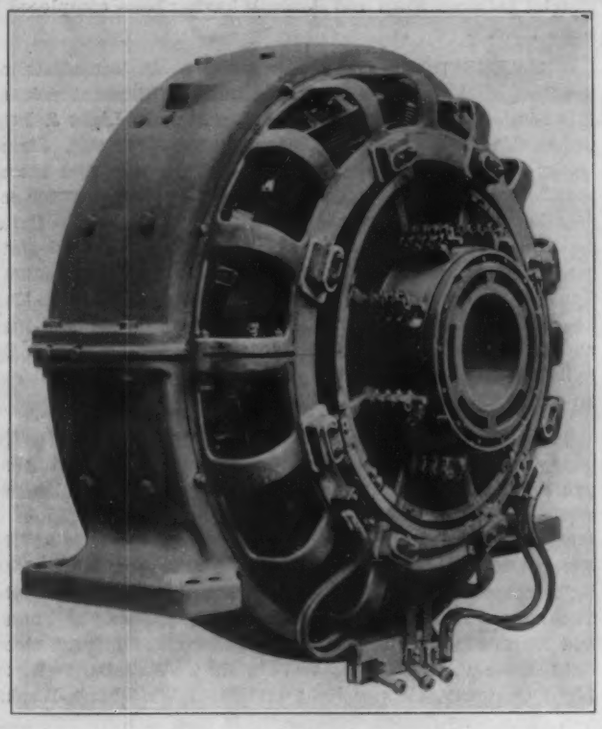
Most electrical troubles in a direct-current generator arise from faulty commutation, especially during overloads. They begin with sparking, which burns away the copper and brush, causing high mica, roughness of surface, flashing, break-downs in installation and deterioration in brushes, brush holders and commutators.

In a non-interpole generator, sparking is primarily due to a local magnetic field surrounding a coil which is being commutated. This field sets up an e. m. f. in the commutated coil, in such a way as to oppose the reversal of the current in the coil, and thus tends to cause sparking as the coil or commutator bar leaves the brush. The action increases with the current or load and is especially destructive on heavy overloads.

In a non-interpole machine sparkless commutation may be obtained if the brushes can be so located that the armature coils shortcircuited by them are brought into a magnetic field of exactly the right direction and strength to neutralize the effect of the local field at the moment of commutation.

Such a field is found to exist near the tips of the pole pieces and it has been customary to advance the generator brushes sufficiently to bring the armature coils within it during commutation; but this field varies in strength under various conditions of load. Instead of becoming stronger as desired with increase of load, it actually becomes weaker.

In type Q generators the proper conditions for commutation are obtained by the use of small poles, interspaced between the main poles. The interpoles have their windings in series with the armature and set up a magnetic field which annuls the effect of the field formed by armature magnetization and generates in the commutated coil an e. m. f. which assists the reversal of the current. Since the interpole coils are in series with the armature, the interpole field strength varies in proportion to the load and it thus has the proper corrective effect at all loads.



Westinghouse Type Q Generator.

Since the e. m. f. due to the interpole, which assists reversal, has a definite position under the interpole, the coil being reversed must be located accurately with respect to this reversing e. m. f. Therefore, the correct position of the brushes must be determined accurately before the generator is put in service. When this point has been properly located, shifting the brush position is not only unnecessary but detrimental. With Westinghouse development of the interpole principle, experience has proven that sparkless commutation is obtained under practically all conditions, from no load to very heavy overloads.

A NEW LINE OF CONVERTIBLE SWITCHBOARDS.

The Western Electric Company has just placed on the market a new line of telephone switchboards, which will fill a long-felt want among small telephone companies. This type, known as the Magneto Convertible Non-Multiple Switchboard, is so designed that it can be used originally for magneto service and then converted at will for central battery operation.

These convertible switchboards are recommended for use in new exchanges where the present conditions call for magneto service, but where central battery service will eventually be used. Their use makes possible the greatest economy right at the start when magneto service is required. Later when it becomes more economical to operate the exchange on a central battery basis the common battery lines can be added as needed, and the switchboard will operate just as economically as a central battery equipment. Oftentimes it is advantageous to make this change from magneto to central battery gradually. This convertible switchboard allows both kinds of service at the same time.

The magneto exchange requiring additional lines to take care of its growing business until the time when it will find central battery operation more economical, will find these convertible switchboards great money-savers. One or more sections equipped for magneto service can be installed, and when the time comes for changing to central battery operation the transition can be made without any loss of equipment.

These switchboards are made in two sizes, the No. 1256, having a capacity of 330 magneto or common battery lines, 30 pairs of cords and 30 transfer circuits, and the No. 1246, having a capacity of 165 magneto or common battery lines, 15 pairs of cords and 15 transfer circuits. They are so designed and constructed that any number of sections can be readily lined up together, so as to make a switchboard with several positions without making a single change in the woodwork of the cabinet, and the sections when so arranged present the appearance of one continuous cabinet.

An important feature of these switchboards is the cord circuits. These circuits are extremely flexible, for, without disturbing the wiring of the board and adding but a few pieces of apparatus five different combinations can be made, as follows:

1. Straight Magneto (without condensers).
2. Magneto with "non-hang-up" feature.
3. Combination cord circuit capable of connecting two magneto lines or one magneto line and one central battery line.
4. Special combination cord circuit, capable of connecting two central battery lines, one magneto line and one central battery line.
5. Universal cord circuit, capable of connecting two magneto lines, two central battery lines or one magneto and one central battery line.
6. Straight central, capable of connecting two central battery lines.

Any of these changes can be made easily and quickly. For example, the addition of the converting relay, which changes the cord circuit from magneto to common battery operation, is made by simply cutting the loop wires back of the switchboard and soldering the relay. To change any line from magneto to central battery operation is equally simple. It is only necessary to change a couple of strap wires on the signal itself.

The well known combined jack and signal, used in the company's No. 1800 type switchboard, is used in this board, and most of the apparatus used is standard, having been employed in many of the company's switchboard circuits for years.

These magneto convertible switchboards are characterized by easy and economical operation, accessibility of all parts, low maintenance expense and are readily adaptable to every service condition.

NEWS NOTES

FINANCIAL.

HAINES, ORE.—By a vote of almost three to one Haines taxpayers have voted in favor of a $20,000 bond issue for the purpose of installing a city water system. The City Council will advertise for the bonds at once.

ELMA, WASH.—The clerk has been instructed to advertise for bids for $10,000 bond issue, the date of opening the bids being fixed for Tuesday, May 16th. The funds are to be used for the betterment of the water supply system. Louis C. Kelsey of Portland is to plan the work.

MORGAN HILL, CAL.—At the meeting of the Board of Trustees last week an ordinance was introduced and referred to the ordinance committee consisting of Trustees Baird, Beach and Lynch, caling a special election to submit to the voters of Morgan Hill the question of voting $13,000 bonds for the acquisition, construction and completion of a system of water-works for the town.

ALAMEDA, CAL.—Bonds to the amount of $175,000 will probably be issued by this city within the next few months to raise money for several necessary public improvements. The municipal electric light plant needs $100,000 for a new building and new machinery, the fire department has made application for an automobile ladder truck, the school department asks for $3500 for the purchase of the lot adjoining the Porter school, and the water front committee ask for $10,000 for the construction of a municipal wharf on the city estuary front property at the foot of Grand street. A special bond election will probably be held in July.

ILLUMINATION.

OREGON CITY, ORE.—A. L. Beatie has presented a 25-year gas franchise.

EVERETT, ORE.—The Everett Gas Company has asked for a franchise for the construction, maintenance and operation of gas pipes and gas mains upon streets in this city.

NEWBERG, ORE.—The local electric company is contemplating extensive improvement to its plant in the near future. Manager Edwards states that the increasing business necessitates heavier machinery.

SAN JACINTO, CAL.—Plans are being carried out for extension of the electric lighting system of San Jacinto. New and more powerful engines will be installed at once and electricity will be furnished for operating pumping plants, as well as for lighting purposes.

MADERA, CAL.—F. C. Roberts has made application to the Board of Trustees to lay gas pipes, mains and conduits in all of the streets, alleys and highways of the city of Madera. Sealed bids will be received by the Board up to 7:30 p. m., May 13th, 1911, for the sale of this franchise.

REDWOOD CITY.—The United Gas & Electric Company has started the construction of a light and power line to Woods. It will extend northward to the Josselyn place and southward to the Family Club. The line will cost about $10,000. The gas and electric company announces that the rate charged for gas on the peninsula will be reduced during the next month to $1.25 per 1000 cubic feet. The present rate is $1.50 per 1000.

WILLOWS, CAL.—All of the material and machinery for the Willows gas plant is on the ground, and unless some unforseen event occurs it will be making and distributing gas by June 1st. More than half of the mains have been laid, and the service gang will begin work next week connecting up the various consumers. Davis & Farnum Mfg. Company who have the contract for the erection of the gas-holder which is of the steel tank type, are rushing the work with all possible speed, and by the end of next week will have the tank portion completed. The material for the holder part has already been shipped from the factory.

SACRAMENTO, CAL.—Electrical current was turned into the second district underground system being completed by the Sacramento Electric, Gas & Railway Company for the first time last week. The system was found to work well. The second district of the underground system, just being completed, lies between Front and Fifth streets. As soon as the new system is in constant use poles will be removed between Front and Fifth in the business district. Workmen are now engaged in excavating for the underground system of the third district, between Seventh and Twelfth streets, the first district between Fifth and Seventh having been completed for some time.

BAKERSFIELD, CAL.—Work will begin immediately on the first of the sub-stations to be built at different points in this section of the county by the San Joaquin Light & Power Corporation. Moron and Maricopa have first call, the site being so situated as to serve both communities and the surrounding country. George R. Stebbins, who has been for some months foreman of construction at the power plant in Bakersfield, has left that work and will be in full charge of sub-station construction, although all of it is under the supervision of General Superintendent Peart. When the Maricopa-Moron house is finished Stebbins will build another at McKittrick and after that Famosa will be provided with a station. Each building will be constructed of steel and concrete, will cover an area of 50x30 feet and will be 30 feet high.

PORTLAND, ORE.—The Pacific Power and Light Company has purchased all the properties of the following companies, and hereafter they will be operated by and in the name of Pacific Power and Light Company: Hood River Light and Power Company, electric light and water systems at Hood River, Oregon; Klickatat Light and Power Company, electric light system at Goldendale and Centerville, Washington; Tucannon Power Company, electric light systems at Pomeroy and Marengo, Washington; Dayton Electric Company, electric light system at Dayton, Washington; Waitsburg Electric Light Company, electric light system at Waitsburg, Washington. The construction department is now at work building 22 miles of 66 kv. line between The Dalles and Hood River, Oregon, and the company expects to begin construction on approximately 75 miles of 66 kv. line which will connect the present system at Walla Walla to Waitsburg, Dayton, Prescott, Turner, Marengo and Pomeroy, hoping to have this line finished by September.

TRANSPORTATION.

REDDING, CAL.—Five thousand dollars will be raised in Shasta County as its share toward making a reality of the west side electric road from Woodland to Kennett.

PORTLAND, ORE.—Terminal facilities for the Oregon Electric road have been secured in McMinnville, to which place a branch line from the main road, running south from Portland, will be built.

SAN JOSE, CAL.—A great suburban loop on the eastern side of the Santa Clara valley, similar to the Saratoga-Los Gatos loop on the western side, is one of the first railway extensions proposed by the new owners of the Hanchett system.

SAN FRANCISCO, CAL.—Plans for a local electric service between this city and the Haggin Grant have received a temporary setback through the refusal of the Northern Electric to allow the use of its bridge over the American River to the Sacramento Electric, Gas & Railway Company.

PASCO, WASH.—A. M. Wehe, of Milwaukee, is gathering data regarding the feasibility of constructing an electric street railway here and eventually extending it to Pendleton, Ore., and Walla Walla points. If the deal is consummated the enterprise will be backed by Milwaukee capitalists.

OAKLAND, CAL.—An ordinance has been granted to the Oakland Traction Company for a 35-year franchise to lay down and operate a street railroad with all necessary convenient side tracks, switches, connections, poles, wires and appliances to be operated by electricity over certain streets in Oakland, beginning at Hopkins street.

GLENDALE, CAL.—E. Goode, builder and former owner of the Glendale & Eagle Rock Railway, is planning several street railways for this section. The largest project will be known as the Everett Railway, which will connect with the Yellow Rock car line at Glassell ranch and will run from there to Workman ranch to Haines property in Glendale, from there it will run along Eighth street to Everett, to Fourth street, along Fourth street to Glendale avenue, to connect with the Glendale-Eagle Rock line. Another will run from Haines' property to Scholl canyon, and another from Fourth and Brand Boulevard to Griffith Park.

OAKLAND, CAL.—Within a month the Southern Pacific Company will commence the reconstruction of the Seventh street tracks to make the line part of the local electric railroad system which is fast being installed by the company. As soon as the necessary material arrives on the ground the erection of poles for the carrying of power wires will be rushed through. Surveyors are now at work at different points along Seventh street getting the necessary data for the engineers to commence work. Before the end of the month contracts will be let by the Southern Pacific for the paving of the thoroughfare for its entire length in accordance with the terms of the franchise granted by the City Council. The company will also pay for the lighting of the street during the life of the franchise and in addition will pay $5000 a year for 15 years and $8500 annually for 20 years to the city for the privilege of the franchise. Surveys and other preliminary work are being carried on at the Sixteenth street station, where the new $300,000 passenger depot is to be built in connection with the main line and the Berkeley local electrical system.

OAKLAND, CAL.—W. R. Alberger, vice-president of the Oakland Traction and Key Route Companies, has been appointed to succeed W. F. Kelly, resigned. Numerous other changes in the personnel of the officials of the two companies were made at the meeting of the directors. Alberger will still retain the position and title of vice-president. The position of general manager and that of assistant general manager are to be abolished when Kelly leaves his work. Alberger will assume the general supervision of both companies. The active management of the two corporations will remain in the hands of the executive board, consisting of F. M. Smith, E. A. Heron, Alberger and a few others. These men have at all times been in control of the systems of the two concerns, despite the fact that officials have been appointed as the heads of these departments. J. Q. Brown, who acted as assistant general manager to Kelly, was appointed to the position of superintendent of all the engineering departments, chief engineer of mechanical and electrical departments and purchasing agent for both companies. Edwin M. Boggs, who has been with both corporations for many years, was appointed to the position of chief engineer of construction and maintenance of way. J. P. Potter, superintendent of the systems, was appointed general superintendent of the marine and rail transportation departments.

MODESTO, CAL.—The Tidewater & Southern Railroad has come out with a definite announcement which means that the Modesto Interurban line, the tracks of which are already laid from this city to Empire, will be in operation within 90 days, and the proposed line between Modesto and the Stanislaus River to the north will be rushed to completion and also running within a few months. An interurban line, 14 miles in length, will be constructed at once and operated on the completion of the construction from the Stanislaus River on the north through Modesto, to Empire on the east. Byron A. Bearce, as general manager of the company, makes the announcement that capital stock in the railroad will be sold at the rate of $1 a share, and that positively all the money secured in this manner will be devoted to the construction of the line from the Stanislaus River to Modesto, a distance of seven miles, and the equipment of the line from this city to Emprie. Twenty-five per cent of the funds are to be paid at the time of the purchase of the stock, 25 per cent on the grading of the roadbed from this city to the Stanislaus River, 25 per cent on the delivery of the rails and ties for this portion of the road at Modesto and 25 per cent when the first car is run. While the work on the seven miles of line from this city to the Stanislaus River will be rushed to completion at once, the order for cars for the Modesto Interurban road has already gone in and the line to Empire will be run on the receipt of these cars, which, at the outside, will be within 90 days.

TRANSMISSION.

KALAMA, WASH.—The Oregon-Washington Corporation is preparing the installation of 12,000 h.p. electric plant at the old site on the Kalama river.

NEW WESTMINSTER, B. C.—The Western Canada Power Company is now surveying the Johnstone road for the construction of towers and poles for a power service.

WALLOWA, ORE.—The McCully & Rumble Company plans to build a power plant in Wallowa canyon, capable of generating 1000 horsepower. Construction work will begin about the 1st of August.

BONNERS FERRY, IDAHO.—A. H. Featherston, owner of the Bonner Water & Light Company, here, with General Manager H. A. Gale, are looking over the plant to determine the improvements to be made this year. The power plant will be enlarged.

SEATTLE, WASH.—The public utilities committee of the City Council has reported for passage the bill providing for the installation of an auxiliary power plant at the foot of Nelson place, on Lake Union, to utilize the waste waters from the Valunteer Park reservoirs.

PASCO, WASH.—E. Tapan Tannatt, consulting engineer, 516 Empire State Building, Spokane, has been engaged by this municipality to set a price for the purchase of the franchise and property holdings of the Pacific Power & Light Company, in connection with the latter's power plant, which the city proposes to purchase.

VANCOUVER, B. C.—The Howe Sound Power Company, Ltd., has applied for water rights for power purposes on Furry Creek. The application for the right to store water in connection with the power plant covers the construction of dams at the outlet of two lakes. The dams will be 30 ft. in height and will increase the area of the lakes to 122 acres.

SAN FRANCISCO, CAL.—At the last meeting of the executive committee of the Great Western Power Company the expenditure of $1,000,000 was authorized to increase the capacity of the present hydro-electric generating station at Las Plumas, on the Feather River, and to start work on a second development above Las Plumas. The company now has 55,000 h.p. installed in its hydroelectric generating station at Las Plumas, which will ultimately be doubled.

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East Liverpool, Ohio.

Thompson Co., The Chas. C. ...
Chicago, 545-549 Wabash ave.

Tracy Engineering Co. 10
San Francisco, 461 Market.
Los Angeles, Central Bldg.

W

Wagner Electric Mfg. Co. .....
St. Louis, Mo.

Western Electric Co. 5
San Francisco, 680 Folsom.
Oakland, 507 16th.
Los Angeles, 119 E. 7th
Seattle, 1518 First Ave. So.

Western Wireless Equipment Co. . 10
San Francisco, Grant Bldg. 7th and Market.

Westinghouse. Elec. & Mfg. Co. ...
Pittsburg, Pa.
Los Angeles, 527 So. Main.
Denver, 429 17th.
Seattle, Central Bldg.
Salt Lake City, 212-214 So. W. Temple.
San Francisco, 165 2d.
Spokane, Columbia Bldg.
Portland, Couch Bldg.
Butte, Lewisohn Bldg.
Canada, Canadian-Westinghouse Co., Ltd., Hamilton, Ontario.
Mexico, G. & O., Braniff & Co., City of Mexico.

Westinghouse Machine Co. 6
Pittsburg, Pa.
San Francisco, 141 Second.

Weston Elect'l. Instrument Co. 9
Waverly Park, N. J.
New York, 114 Liberty
San Francisco, 883-884 Mission.

Wilbur, G. A. .....
San Francisco, 61 Second.